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Railway & Commercial Gazette

Vol. CCXL No. 6141

LONDON, MAY 1, 1953

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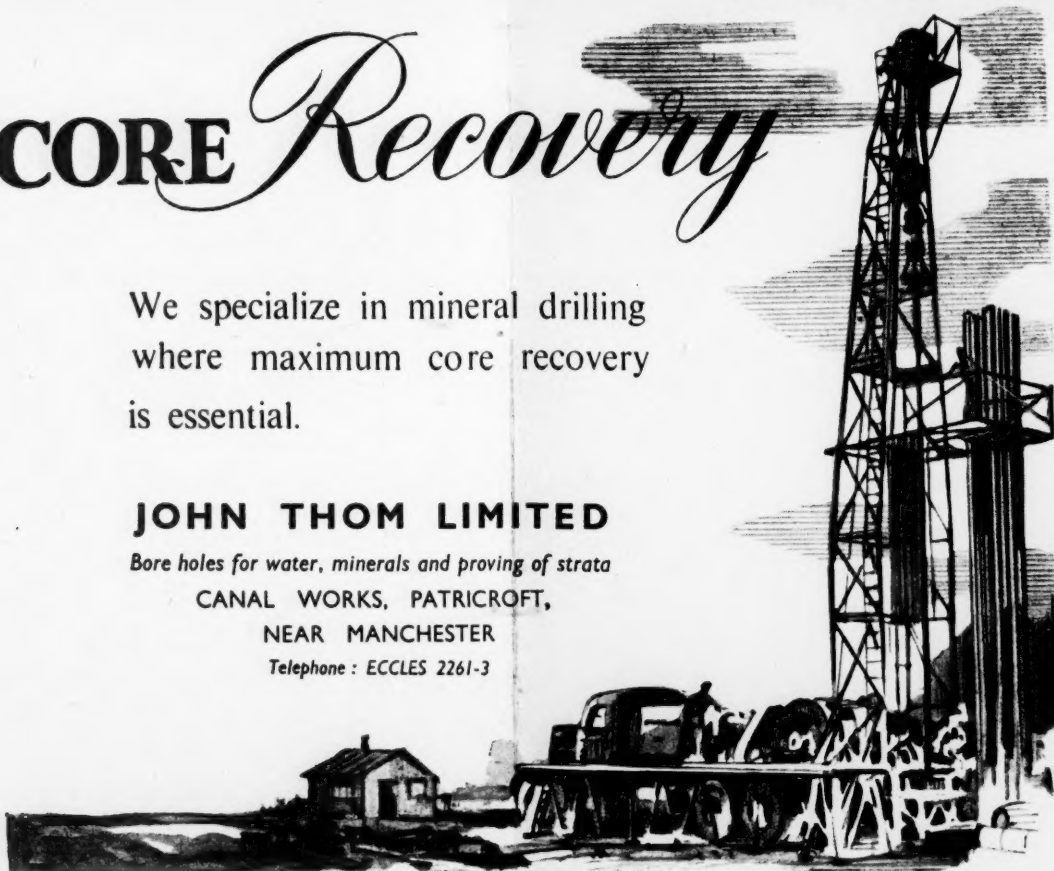
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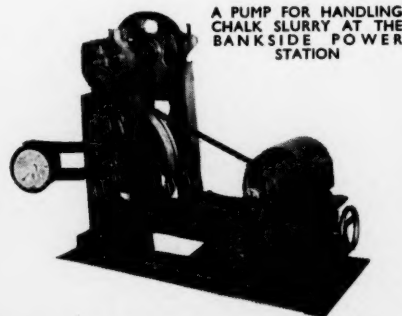
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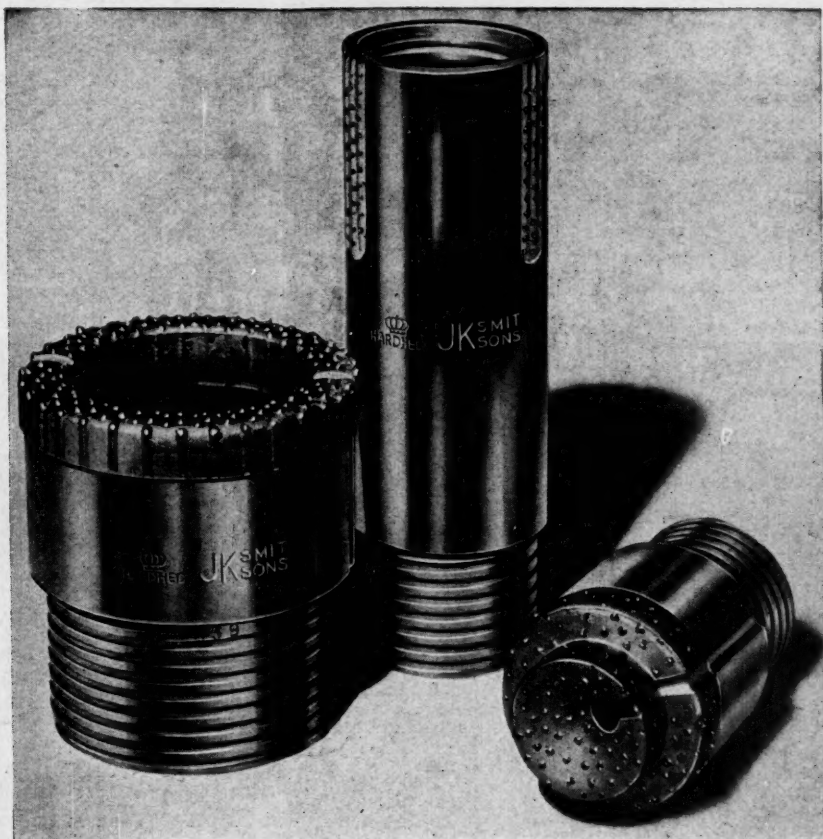
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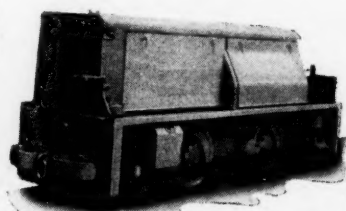
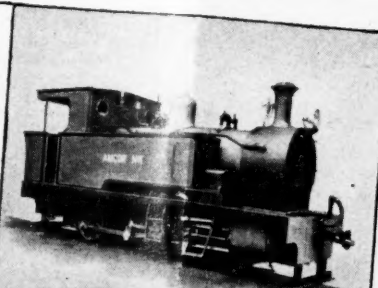
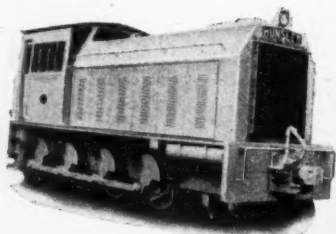


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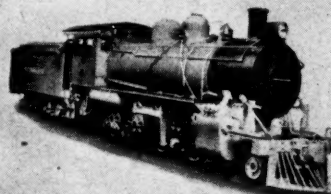
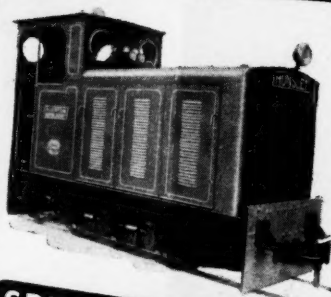
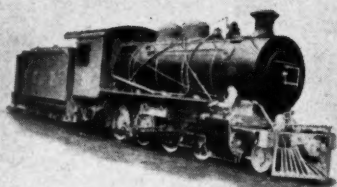
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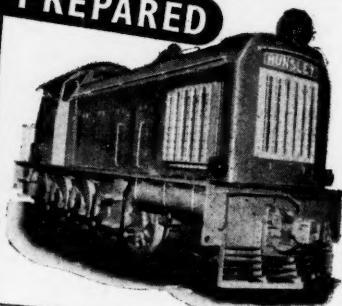
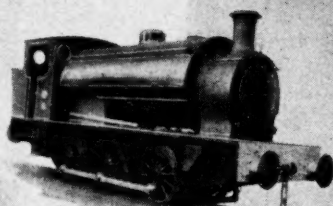
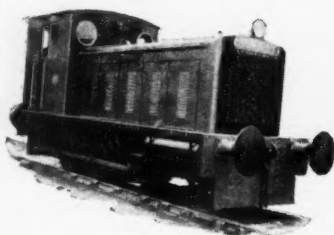
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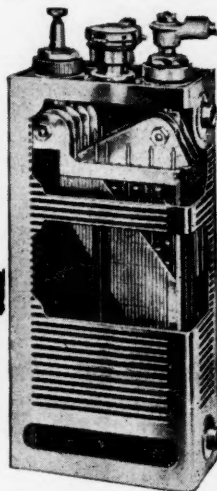
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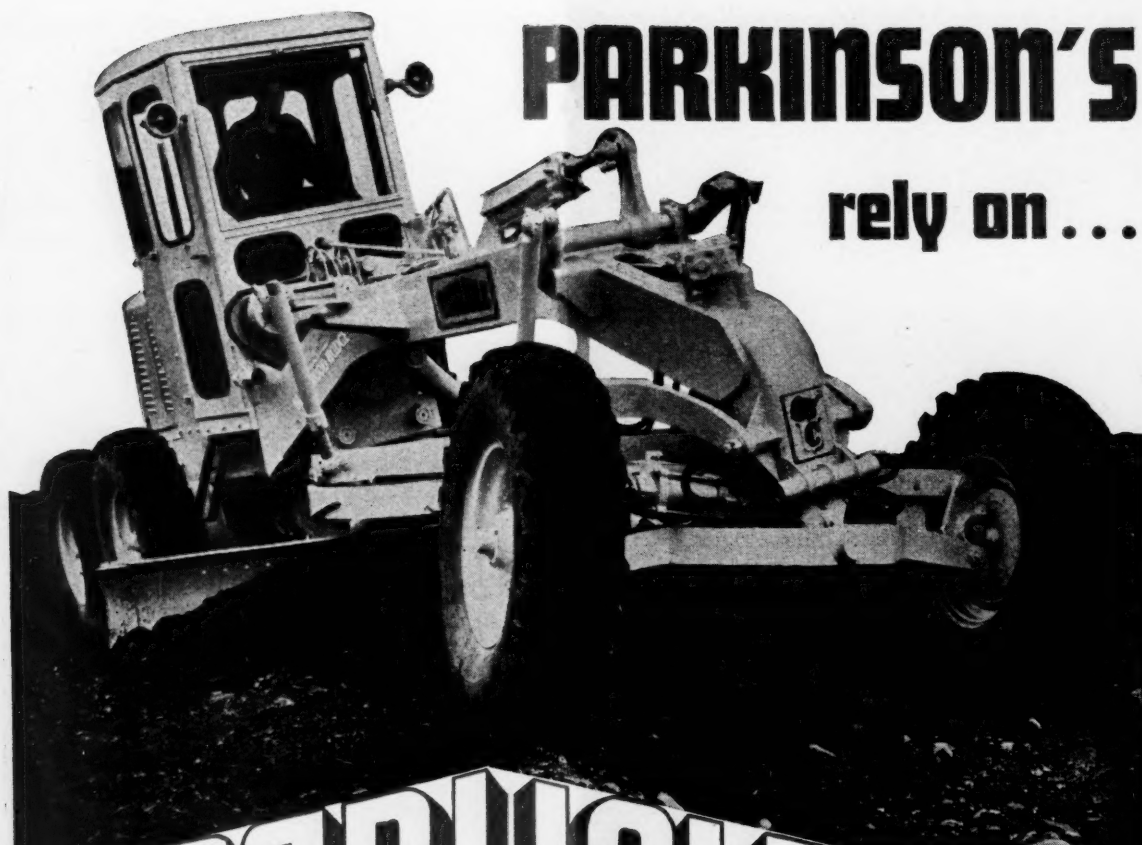


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# The Mining Journal

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## NOTES AND COMMENTS

### Anglo American Talks Over Wankie Colliery

The arrangements, announced at the beginning of this week, by which the Rhodesian investment company of the Anglo American Corporation group will acquire the interests held by Powell Duffryn in Wankie Colliery and the Anglo American Corporation of South Africa will become managers, consulting engineers and buyers for Wankie was unexpected.

Coal production at Wankie has been raised by no less than 56.4 per cent over the tonnage produced in 1948—no mean achievement in view of the difficulties in obtaining an adequate supply of good African labour, particularly coal-face workers, while at the same time carrying out a programme of thorough underground mechanization. Despite this achievement results have not been satisfactory. This comment arises from a subjective rather than an objective analysis of the company's record, for Wankie occupies a unique position in Central Africa, as it is the only source of supply of coal and metallurgical coke within a radius of 500 miles. Thus its results tend to be judged by the hard criterion of who, and how many, of its customers' requirements are left unsatisfied.

Although during the year to August 31, 1952, output of saleable coal reached 2,594,178 tons, an increase of 10.8 per cent over the preceding year's figure of 2,342,133 tons, actual output fell short of the estimated target figure of 2,860,000 tons by approximately 266,000 tons. Since the production targets set each year provide a reasonably accurate guide of the tonnage of saleable coal necessary to meet the estimated requirements of the company's markets, any short-fall from this figure has serious ramifications.

That being so, the decline in output last year made its most telling impact on the four Northern Rhodesian Copperbelt producers whose expansion projects, now in varying stages of completion, depend for their achievement on adequate fuel supplies from Wankie. At one time when fuel supplies over any given period fell short of requirements, wood burning was resorted to with a fair measure of success, but now inadequate coal supplies leave a gap which cannot be satisfactorily filled in this manner and operations must be curtailed.

This is the current situation and the Copperbelt producers are at present having to restrict their operations. While the capacity of the Rhodesia railways is always a potential bottleneck in Wankie's coal deliveries there is no escaping the fact that even if railing facilities were more than adequate, Wankie's coal production would still fall short of actual requirements.

Bearing this in mind it does not require much imagination to see that the Anglo American Corporation of South Africa and Selection Trust who, between them, have been responsible for the establishment of the companies on the Copperbelt should be concerned over the inability of Wankie to enable their interests to operate at full capacity. (Nor, for that matter, the Northern Rhodesian Government whose annual revenue is largely derived from the Copperbelt companies.) Either of these companies have the necessary resources to acquire a controlling interests in Wankie, but Anglo American Corporation, with its vast coal interests in the Transvaal and long experience of coal mining under local African conditions, was the logical choice to take a more active part in trying to raise Wankie's production figures. The Corporation has already gone to considerable lengths to assist Wankie in this endeavour and it may be recalled that the Corporation was largely responsible for the sending of some 1,400 additional mine workers to Wankie during the first nine months of 1951 for this purpose.

The persistent coal shortage obviously called for a major change of policy or methods. Wankie's answer to this seemingly intractable problem was to use additional capital, estimated in some quarters at as much as £5,000,000, to implement a programme designed to increase production to 3,800,000 tons this year rising to 4,300,000 tons in 1954 and 5,000,000 tons in 1955.

Whether or not the new funds required amount to as much as £5,000,000 remains to be seen. But, in any event, the Anglo American Corporation of South Africa is in a far better position marketwise to raise new capital than Wankie.

The change of management is being brought about by the issue by Rhodesian Anglo American of 250,000 of its reserve stock units of 10s. each in exchange for Powell

Duffryn's holding of 800,000 shares of 10s. each in Wankie and by the acquisition by the Anglo American Corporation of Powell Duffryn's total shareholding in Powell Duffryn (Rhodesia) Ltd. in exchange for 70,000 stock units of 10s. each in Rhodesian Anglo American.

With Anglo American Corporation as the new managers, several important questions come up for scrutiny. First and foremost of these is the question of coal allocations. At present, the consumer market for Wankie coal extends to Southern and Northern Rhodesia, Nyasaland, Bechuanaland, the Belgian Congo and Portuguese East Africa. Therefore, if the present system of allocations is to be revised in favour of the Copperbelt producers it would seem reasonable to assume that it will be at the expense of Territories other than the two Rhodesias—although with Nyasaland forming part of the proposed Central African Federation its allocation will probably remain unaffected. Secondly, the question of policy arises as to whether Anglo American Corporation will attempt to raise the additional tonnage by reverting to the original scheme of large-scale opencast methods or carry on with the present policy of sinking a third colliery expected to come into full-scale operation sometime in 1954. Either alternative suggests that new funds will be required.

In any event, the change of ownership is of considerable moment to Central Africa for the mining and industrial expansion curves of the two Rhodesias lie along a line parallel with Wankie's production curve, and unless and until Wankie Colliery can substantially increase its coal production, the full potential worth of these territories cannot be realized.

#### Canadian Asbestos Investment in Southern Rhodesia

A Canadian company, Rhodesian Asbestos Ltd., has invested more than £2,000,000 in an asbestos scheme in Southern Rhodesia. The scheme represents one of the biggest overseas investments in Southern Rhodesia for several years.

Large-scale development is planned at Mashaba, near Fort Victoria, where the company is progressively opening up two of its holdings. The Temeraire, Shashi and Shamala asbestos properties in the Magluba district have been purchased, and exploratory work is currently being carried out on other Southern Rhodesian asbestos properties. The company also owns property 40 miles west of Salisbury containing asbestos deposits which are being explored.

The present operation is designed to bring the Temeraire and Shamala mines into production on a large scale, with the output jointly milled at the Temeraire property. These two mines are producing on a small scale, and it is anticipated that eighteen months must elapse before full production is attained. The new company has laid down the policy that its mines will be operated by Rhodesians.

In our issue of February 1, 1952, it was reported that the directors of Anglo-Huronian had announced that they had acquired an 11½ per cent interest in the new company. Up to the end of 1951, the Patiño interests and the British Metal Corporation had expended over \$1,000,000 in acquiring and developing certain of the properties already named. Together with Anglo-Huronian Ltd. the respective interests of the participating companies in Rhodesian Asbestos Ltd. are Johns-Manville Corporation, 51 per cent, The British Metal Corporation Ltd., 15 per cent, Simon I. Patiño, 11½ per cent, and Southern Minerals and Marketing Corporation (Pty.) Ltd., 11½ per cent.

The growing financial stature of Toronto is significantly emphasized by the fact that Rhodesian Asbestos Ltd. will have its headquarters in that city despite the greater interests held by the American Johns-Manville Corporation and The British Metal Corporation.

#### Output of Industrial Diamonds

The latest diamond market report of J. K. Smit and Sons asks three pertinent questions relating to current output of industrial diamonds. After asking whether over-production of industrial diamonds exists to-day, the report further enquires whether the Diamond Syndicate has the situation firmly enough in hand to stabilize prices, and whether the independent diggings of diamonds in West Africa can be continued in view of the overall condition of the market.

In response to the queries raised, the report points out that the sound principle for world stability in diamond production is a healthy relationship between production and consumption. The report further observes that the Governments of South Africa, Belgium, Portuguese East Africa and Tanganyika are co-operating with the Syndicate to help stabilize the diamond market. This is particularly true of the Belgian producers, who supply 85 per cent of the crushing board required for precision tools.

## The Belgian Congo

(From Our Own Correspondent)

Brussels, April 20

On March 23 last the Governor of Katanga, M. Wauthion, reviewed the progress of the province during 1952. In the course of his speech he said increases in output were copper 205,000 tonnes, compared with 186,000 in 1951; cobalt 7,000 tonnes, compared with 5,700; and manganese 138,000 tonnes of ore compared with 71,000.

Production of coal increased from 218,000 tonnes to 251,000 tonnes. This was the more gratifying as the Wankie coalfields failed to supply the full contracted amount. Géomines foresees an increase in its tin output due chiefly to the putting into commission of additional turbines at its Piana Power Station, which should go into commission in 1956. This will raise current output from 3,537 tonnes to around 7,000 tonnes.

Early in 1952 Katanga suffered from serious transport difficulties and it is only recently that normal conditions were restored. The geographical situation of the province is unfavourable. Elisabethville, the capital is seven days' railway journey from Beira (1,791 kilometres), eight days from Lobito (2,107 kilometres), and ten days from Lorenzo Marques (2,578 kilometres). The normal delays were in many instances trebled and supplementary charges and jamming of freight caused further loss.

The Lobito Bay route was the first to overcome these vicissitudes. Imports increased from 128,000 to 193,000 tonnes and mineral exports from 217,000 to 256,000 tonnes. The rate of freight handling which was 12,000 tonnes monthly early in the year reached 18,000 tonnes at the end, moreover stocks at Lobito were reduced to some 6,000 tonnes, chiefly coal.

The Matadi route, which is the longest, regained its normal rate, although imports through the Sakania route decreased from 163,000 to 151,000 tonnes and exports were reduced from 153,000 to 100,000 tonnes. This reduction was due to the abrupt suspension of coal deliveries by Wankie. Exports were down as the result of the systematic reduction in mining quotas by the Rhodesian railways.

The Great Lakes route made a serious effort to improve transport, mainly up the Congo, and Alberville on Lake Tanganyika handled 120,000 tonnes as compared with 74,000 tonnes four years earlier.

Transport should certainly be improved this year as 250 railway trucks and eight electric locomotives were added to the rolling stock in 1952 and 300 trucks have been delivered since.

# Western United States

(From Our Own Correspondent)

Portland, Oregon, March 31

If we have referred to the copper price situation during the past year as confusing an apt expression for the present would be "confusion worse confounded." Price control which has held the metal at a ceiling of 24½ c. was removed February 25 and within hours Kennecott had advanced the price to 27½ c. Phelps-Dodge followed shortly with 28½ c. and on March 2, Anaconda with 32 c., meanwhile custom smelters going as high as 36 c., the price of the foreign metal. At this writing published prices are from 28½ to 32 c. and now comes word that Belgian Congo will enter the United States market in April and is expected to ship 2,000 to 3,000 tons per month, also that Rhodesia has contracted to sell 15,000 tons in the United States during the second quarter of 1953. The natural deduction is that the improved price will stimulate domestic production which will tend to a curtailment of imports with an ultimate adjustment and stabilization of the market. That the increased production is in the offing is indicated by news from different districts.

## OPEN PIT OPERATIONS IN ARIZONA

In Arizona Bagdad Copper Corporation has an expansion programme under way that will increase its daily output from 3,500 tons to 9,000. After many years of underground mining, first as selective of the better ores and then as block caving which brought production to 1,000 tons daily, Bagdad was converted to an open pit with output of 3,500 tons and an exploration programme initiated. This proved the existence of 60,000,000 tons of ore, sulphide and oxide, of an average copper content of 0.595 per cent from which it may be expected to recover eventually approximately 250,000 tons of copper with byproducts of gold, silver and molybdenum. Sulphide concentrates will be roasted in a fluo-solids reactor, leached by countercurrent decantation and copper recovered (99.9+ per cent) in an electrowinning plant. A factor in the expansion plans is that Bagdad has a contract with D.M.P.A. to purchase 27,000,000 lb. of copper per year at a floor price of 24½ c. and 940,000 lb. molybdenum in concentrates at a price of 60 c. per lb. MoS<sub>5</sub>.

## THE STANDING OF GOVERNMENT CONTRACTS

Miami Copper Co. has made a contract with the Government to supply 230,000,000 lb. of copper at a guaranteed price of not less than 27.35 c. to be produced from a large low-grade ore body near Miami's present operations. Average content is reported as about 0.50 per cent which was considered submarginal under the ceiling price of 24½ c. Obviously such Government contracts as those of Bagdad and Miami do not have the same weight now as when price control was in effect. Magma Copper Co. has acquired the holdings of St. Anthony Mining and Development Co., not far from Magma's San Manuel operation. St. Anthony was closed down last year, a contributory cause being the heavy flow of underground water which was one of the factors which interested Magma as San Manuel can make good use of the water at its plant and townsite now under construction. In Montana, Anaconda Copper Co. has contracted to buy all of the assets of North Butte Mining Co. These include the Granite Mountain, Speculator, Tuolumne and Gen mines in the Butte district and substantial stock interest in Redemption Copper and Unity Gold, the latter in Colorado's Cripple Creek district.

"Finis" is being written for one of the famous Arizona mines with the announcement that at the United Verde pillars are being drawn and all work will cease about May

1. Bought about the turn of the century for \$60,000 by the late William A. Clark, one of Montana's early day "copper kings," United Verde proved to be a veritable bonanza and returned many millions in profits. In 1935 when the cream of the high grade was supposed to be skimmed off it was purchased by Phelps-Dodge at a price reported as in excess of \$20,000,000.

Another venerable old mine reached the end of the trail when the holdings of Carson Hill Gold Mining Corporation in Calaveras County, California, were sold for \$35,000. Included in the 1,100 acres were two of the famous mines of early days on the Mother Lode, the Melones and Morgan. The latter founded the fortune of James G. Fair, later one of the "Big Four" of bonanza days on the Comstock Lode, and yielded the largest nugget ever found in California, a mass of gold embedded in a quartz vein and valued in excess of \$50,000. In the decade of the "teens" of this century Bewick, Moreing and Co. consolidated the two properties and attempted large scale operation but without success and a later try was made by Anglo-American Mining Co. of San Francisco.

## ACTIVITY IN THE COEUR D'ALENE

Among the western states Idaho is the leading producer of silver and lead and second to Montana in zinc. By far the most important district in Idaho is the Coeur d'Alene which after 70 years of steady production is shown to be by no means delimited and is still responding to exploration as the older mines reach for lower levels or drive into hitherto unexplored territory. Lucky Friday in lateral work on its 2,000 level has opened one of the largest shoots ever found in the district with ore for more than 900 ft. and width up to 16 ft. Polaris is driving a two mile exploration crosscut easterly from the 3,000 level of its Silver Summit mine to American Smelting's Galena and after completing the crosscut will carry on lateral development of the territory thus opened up. Bunker Hill and Sullivan has doubled the capacity of its ventilation system, to 3,500 c.f.m., with definite improvement in the lower levels.

## GENERAL METALS

The shortage of power in the Pacific Northwest due to an unusually low water supply in 1952, has been relieved and the order of a cutback of 10 per cent issued last November has been rescinded. This permits the aluminium and magnesium plants in Oregon and Washington which were dependent on Bonneville and Grand Coulee power to resume capacity operation and also relieves the shortage in the Coeur d'Alene district in Idaho. Harvey Machine Co., which is constructing an aluminium plant at The Dalles, Oregon, has bought a pilot plant which was built at Salem during the war for research on extraction of alumina from ferruginous clays that are abundant in the locality. Harvey will carry on the research and meanwhile has arranged to receive bauxite from the Guianas.

Minerals Engineering Co. of Grand Junction, Colorado, allied with U.S. Vanadium and Climax Molybdenum, is constructing a concentrating mill near Glen, Montana, for treatment of the tungsten ores of the Brown Lake and Birch Creek districts. The company has acquired a 12 acre site at Salt Lake City, occupied by a tungsten mill during World War II, and will construct a tungsten refinery there. First feed will be 29,000 tons of residue that were acquired with the site. The Atomic Energy Commission has set aside 15,000 acres of land in the Colorado Plateau region and reserved it for uranium exploration and development. D.M.P.A. has entered into a contract with Hanna Nickel Smelting Co., which is developing a large garnierite deposit at Nickel Mountain in Douglas County, Oregon, to purchase 125,000,000 lb. of nickel, 5,000,000 at 79.39 c. and 120,000,000 at 60.5 c.

# Mineral Resources of the Belgian Congo

The following article, condensed from a report appearing in *Mineral Trade Notes*, Vol. 35, No. 5, published by the U.S. Bureau of Mines, gives brief note of the mineral resources of the Belgian Congo. The report lists metallic and non-metallic minerals as well as precious stones.

A report by Mr. T. G. Murdoch, U.S. Consul in Elizabethville, lists the following metallic and non-metallic minerals known in the Belgian Congo.

**Arsenic**—Arsenic, as arsenopyrite, is often associated with some of the tin deposits, especially the vein deposits at Mitwaba, and with veins of auriferous quartz, as at Mount Kikubara and on the Zalya. It also is found as crystalline masses in the quartzites at Kikendja. Its possible economic importance is not known.

**Bauxite**—The lateritic phenomena so common in tropical regions has led to the formation of bauxite deposits, two of which appear important: Niapu and Niangara in Oriental Province. High-alumina clays and kaolin also are fairly abundant in the Congo and under certain conditions might eventually be used as an ore of aluminium.

**Beryl**—Beryl has been reported in the pegmatites of Maniema and of Ruanda-Urundi.

**Bismuth**—Bismuth, in the native state and as the sulphide or carbonate, has been found in some of the pegmatites of Maniema and Ruanda-Urundi. A few hundred kilograms are produced annually.

**Cadmium**—Cadmium is recovered in Katanga in processing copper and zinc ores.

**Cerium**—Bastnaesite is produced by Somuki from the Karonge mine in Ruanda-Urundi.

**Chrome**—In 1949 the Comité Spécial du Katanga granted an exploration permit for chrome. No details as to location are available.

**Cobalt**—The only reported occurrences of cobalt are as associated minerals of copper in the Katanga, and production is essentially as a byproduct of the copper industry.

**Columbite-tantalite**—Columbite and tantalite are accessory minerals within the tin-producing areas of the Congo and Ruanda-Urundi. Géomines, at Manono is the principal producer. One authority has considered the Congo as the richest source of these minerals in the world.

## COPPER ACTIVITIES OF UNION MINIERE

**Copper**—Union Minière du Haut Katanga is the principal copper producer. The owner of Anglovaal, a copper prospect, has been trying to develop this property without much success. A copper deposit known as Kapulo, north of Lake Moero, is associated with a granitic intrusion within a concession belonging to Simkat. This deposit might have economic importance, but its distance from rail transportation has prevented its development. Copper has been reported in the Stanleyville region in the granites of Bamanga Island and in the limestones to the east of Stanleyville. An area of copper-bearing veins has been discovered at Bemba-Kilenda, 90 kilometres east of Madimba in Moyen Congo. The copper is associated with zinc, lead, and vanadium minerals and barite veins. Recent exploration in this region indicated that the deposits are economically important and development is planned if not already begun.

**Germanium**—Germanium occurs as renierite, a sulphide mineral, in the complex sulphide ores of the Kipushi mine. Investigations have been carried out towards recovering germanium from flue dusts at the Lubumbashi smelter. No recovery has been reported.

**Gold**—Numerous gold deposits have been exploited in Uele, Ituri, Maniema, Kivu, Ruanda-Urundi, Kasai, Bas-Congo, and the northern, central, and southern parts of Katanga. The alluvial deposits were originally the principal source of gold, but during the last two decades production from lode deposits has increased. Some gold is ob-

tained as a byproduct of copper refining. Total reserves at the end of 1945 were given at 137,000 kilograms of unrefined gold.

## CONSIDERABLE DEPOSITS OF IRON ORE

**Iron Ore**—Reserves of iron ore in the Colony are extremely large. Conditions suitable for the development of an iron and steel industry are not ideal in the Congo. Nevertheless these deposits constitute a latent source and will be developed when local demands or exhaustion of world reserves of rich ores may require recourse to new centres; the Congo can supply millions of tons of iron ore.

**Lead**—The small output of lead has been chiefly from the Kengere mine in Katanga and there is a recovery of lead from blast furnace gases at the Lubumbashi smelter of Union Minière. Lead also is associated with copper in the Kasai and Bas Congo. Traces of galena have been reported in Ituri and on the west bank of Lake Kivu.

**Manganese**—The only economically exploitable deposits are those in Katanga, and, with the opening up of the Kisenge mine, south of Malonga, production is expected to reach 250,000 tonnes a year.

**Molybdenum**—The sulphide of this metal is known at several places in the Congo, but there are no indications of an economic mineralization. The occurrence is mainly as an accessory mineral in pegmatites or tin-bearing quartz.

**Nickel**—Sulphides of nickel have been found as accessory minerals at one or two localities in Katanga. Some traces of nickel sulphides have been reported from Kivu without indication as to locality.

**Palladium and platinum**—These metals were found in association with gold at the Ruwe mine near Kolwezi, however, the superficial deposit has been worked out and copper is now being mined below the original capping. A small output of platinum group metals is reported for recent years, having been recovered from copper exported to Belgium for refining. These metals also have been found associated with gold in some deposits of the north-east.

**Silver**—Silver is recovered on a large scale in copper products of Katanga and refined in Belgium, and a small quantity is recovered as native silver, a byproduct of gold mining in the north-east. It also is known at Bemba Kilenda in the Moyen Congo.

## EXTENSIVE RESERVES OF TIN

**Tin**—Although the Congo has been an important producer of tin for some years, reserves are extensive. All of the major producers are continuously prospecting in order to maintain their reserves. The Comité Spécial du Katanga has set aside and plans to survey a 44,000 square kilometre area known as the Reserve Minière du Lualaba.

**Titanium**—Ilmenite and rutile is fairly abundant in concentrates from the exploitation of gold, diamonds, and tin. Some rather pure rutile is found in some veins and in the alluvials of the region south-west of Lake Albert and in central Katanga.

**Tungsten**—Tungsten is known and exploited in the Congo and Ruanda-Urundi, in the form of wolframite and scheelite. Its distribution is the same as that for tin. Most of the occurrences are associated with tin, but there are a few places where tungsten minerals are mined alone. Other tungstates, hubnerite, ferberite, and anthoinite, the latter originally discovered in Maniema, occur as accessories.

**Vanadium**—Vanadium, in the form of descloisite and psittacinite, is reported to occur in several localities in

Katanga and in the Bas Congo. There is no indication that these occurrences are economically important.

**Zinc**—The Kipushi mine has been the source of zinc output in the Congo. It reportedly occurs also in association with copper in the Lubi and Lukulu regions of Kasai and in the Madimba area of Moyen Congo. The latter occurrence may prove to be economically important.

**Zircon**—Since 1910, when a small isolated crystal was found in the alluvial concentrates of the Yebu River, numerous prospecting operations have shown the extension and sometimes the abundance of the mineral in some alluvials of the rivers Yebu (Uele); Luizi (Luvia); Kalasangashi; Musele; Mauama; Lulua. It has also been found in the tributaries of the Upper Lualaba. The kimberlitic rock at the Bakwanga diamond mines contains orange zircons reaching a cubic metre, in crystalline form. The discovery of baddeleyite, in the concentrates of auriferous alluvials of the Nedi near Bambili has been reported.

### NON-METALLIC METALS

**Andalusite**—This mineral is found in the diamantiferous alluvials of Kasai and in certain pegmatites around Lake Kivu. There are no indications that it is present in economic quantities.

**Asbestos**—Asbestos is known in the Bas Congo, especially at Matadi. To date only thin veinlets are known there. Long fibre asbestos is reported at Mahagi (Lake Albert). Some samples show it to be altered but it is believed probable that at depth the mineral would be of better quality. Blue asbestos (crocidolite) occurs in large deposits near some of the copper deposits in southern Katanga.

**Barite**—Some veins of barite have been located in the Moyen Congo (at Madimba), on the Bangu (in the Mayumbe), and in southern Katanga. It accompanies the copper in Katanga and in Moyen Congo.

**Clays**—High-alumina clays and kaolin also are fairly abundant in the Congo, and under certain conditions these might also eventually find a use as an ore of aluminium.

**Corundum**—This mineral is found in different mines of Kivu and in Maniema, but the occurrences do not seem to be economically interesting. A rather massive deposit along the Haut Lualaba River, in southern Katanga, was investigated during World War II with a view to its eventual exploitation.

**Diamonds**—Although the Congo's place as the world's first diamond producer is due to the developments around Bakwanga and Tskikapa, Kasai Province, the precious stones are known in other parts of the Colony. On the Kundelungu Plateau of Katanga there are numerous kimberlite pipes. These and the alluvial areas around them are commonly considered to be of no economic importance. However, this view is not completely accepted by some Belgian geologists. Diamonds also have been found in the Lomani, the Ituri, and the Ubangui, as well as in the Uele and the Mayumbe. However, these are commonly regarded as of little economic importance and they have been found mainly during placer operations for recovering gold. One company is considering exploring in the northern sector.

**Feldspar**—Some feldspar of excellent quality and suitable for ceramic use is abundant in the Bas Congo (Cul-de-Boma, Monolithe, Kungu, Bousin, etc.) and in the tin-bearing pegmatites of the east part of the Colony and in Ruandi-Urundi.

**Fertilizer minerals**—The use of chemical fertilizers, not yet applied to the correction of agricultural soils of the Congo, is necessary. Some mineral resources could be exploited or prospected to serve this purpose.

In Uganda some deposits of apatite in association with the pegmatites have been discovered. The geologic conditions of Ruandi-Urundi give some hope for a similar discovery. Along the coastal region and the Kaiso beds of the Semliki are some fossilized bones and some coprolites—

indications of the presence of phosphatic concentrations. In Ruanda-Urundi there are deposits of ambygonite.

The manufacture of nitrogenous fertilizers has been proposed, using limestone and nitrogen from the air. This depends upon the availability of cheap hydro-electric power, and once the extensive power resources are more widely developed it is expected that such a project will become a reality.

Kivu contains vast horizons of lavas rich in potash. Some countries use such rocks to prepare potash fertilizers.

**Graphite**—Graphite schists occur in the Mayumbe, in the Katanga, and in Ruanda-Urundi. The recovery of the graphite from these by flotation has been suggested but it apparently has gone no further.

**Kyanite**—In addition to the kyanite contained in the alluvials in the diamond and gold regions, and in the pegmatites of the north of the Colony, there is a deposit along the Northern Rhodesia-Katanga frontier, which is said to be of hydrothermal origin and of probable economic importance.

**Lithium**—Spodumene, a lithium-aluminium silicate, comprises an important constituent of the tin-bearing pegmatite at Manono, and Géomines, the operating company, has given some consideration to its possible utilization as a raw material for lithium salts and even the metal, but no commercial development can be expected until more power is available in the area.

**Mica**—Mica in large sheets is known to occur within certain pegmatites of the tin zone of the eastern part of the Colony. In other pegmatites, and in Ruanda-Urundi especially, there is considerable scrap mica, the recovery of which would present no difficult problems provided there were markets.

### POOR OCCURRENCE OF PRECIOUS STONES

**Precious and semi-precious stones**—Except for diamonds, the Congo is rather poorly mineralized in this respect. In Kivu, however, some small concentrations of rubies, white zircons, and pink and green tourmalines have been found, and some sapphires have been picked up. Topaz occurs in certain greisens of the tin area but no economic occurrence is known. Garnets abound in a number of metamorphic rocks around Boma, in the Katanga, and the Ituri. All varieties are known. Few of these are gem material but they could fill abrasive specifications. Amethyst is known to occur in the Bas Congo, Kasai, and Kivu. Chalcedony, and sometimes, very beautiful agates are found in the alluvials along the rivers of Kasai, Kwango, and Moyen Congo. Agate occurs within the amygdaloids of a volcanic rock at Tshala on the Bushimaie.

**Quartz**—Quartz is abundant in the form of sand, sometimes very pure as in the Moyen Congo, and as vein quartz. On the Plateau of the Cataracts and in southern Katanga as well as in Maniema, Kivu, and Ruanda-Urundi, large crystals of hyalin quartz are found. Some of these, reportedly, have piezo-electric properties.

**Sillimanite**—This mineral, an important raw material for refractories, is known to occur in several metamorphic rocks surrounding the Congo Basin and especially in the quartzites of the Albertville region. No economic concentration is known.

**Sulphur**—Sulphur occurs as a filling of geodes within some limestones in the Bas Congo. It is also found within volcanic regions of Kivu. Pyrite is fairly common as a constituent of the various rocks in the Congo and perhaps some economically recoverable deposits may be found. However, the zinc concentrates from the Kipushi mine of Union Minière supply a quite satisfactory raw material for the manufacture of sulphuric acid at Jadotville. Some consideration has been given to the recovery of pyrite contained in the Luana coal.

# Roof Bolting in Australian Metal Mines

By A. H. HILL, B.Sc.(Hon.), Assoc.I.M.M.

The following article is the outcome of a recent tour of Australian mines which was undertaken by the author with the aid of a United Nations Fellowship. The Senior Assistant Government Mining Engineer, Gwelo, the author compiled a report on roof and wall bolting as practised in Australian collieries and metalliferous mines during the period he spent in the country, and the following extract, which has been published in *The Rhodesian Mining Review*, describes the theories of bolting and discusses the applications of the practice on roofs and other faces in Australian mines.

The start of recent applications of roof bolting was in 1943, when a paper was published in the *Engineering and Mining Journal* (May), by W. W. Weigel, describing the use of bolts with channel iron plates at St. Joseph Lead mines. In 1947 the U.S. Bureau of Mines saw in suspension supports an answer to coal mining problems, and studied the matter fully, and by 1949 the method was in use in base metal mines as well as coal. In mid 1951 roof bolts were being manufactured in the U.S.A. at the rate of 2,000,000 a month, which is conclusive evidence that the method is winning favour.

## AUSTRALIAN METALLIFEROUS MINING PRACTICE

This method of support has spread rapidly from the coal mining areas, where it originated, to metalliferous mines all over the Commonwealth, and is now found in use in the largest mines, as well as in the small ones. It was found, however, particularly in the smaller mines, that the hazards connected with the indiscriminate use of this method of support, were not always appreciated, and that considerable risks were often being taken.

Roof bolting was seen in use in reefs varying in dip from horizontal to vertical. The wedge type bolt was universally used, as it is easily made on the mine. The types of ground in which bolting was used, varied very considerably indeed, as did the reliance placed upon it. It was found, naturally, that the use of roof bolting was not necessary, or that it was being used under wrong circumstances in a number of cases, and by seeing as many cases of misuse as of good use, a very good idea of the proper use is obtained.

## THEORIES OF BOLTING

It is obvious that the theory and calculations for flat bedded roof bolting as in coal mining cannot apply, or must be very much modified in the case of homogeneous rocks, especially when these are standing at a very steep angle. Under these circumstances the shear on the bolt becomes very appreciable and the work a bolt or bolts will do, often depends purely on the shearing strength of the steel used in the bolt.

It is possible, under most circumstances which can occur, to calculate the work to be done by the bolt, and for this one needs to know the weight of the rock, the shearing strength of the bolt, and the tensile strength or thread-stripping pull. Given these and the safety factor desired, the calculations are purely mathematical.

## LENGTH OF BOLTS

The maximum length bolt that can be put into a working place is, of course, dependent on the width of that place. Since the bolts are generally working under different circumstances to coal mining, the maximum length bolt is not generally necessary. It has become accepted practice in Australian mines that as long as the bolt penetrates a minimum distance of 12 in. into solid rock, that it will stand maximum pull. Accepting this as practice it is not, therefore, necessary to use a long bolt under many circumstances.

Thus, in a six foot wide stope where it is desired to hold 1 ft. of hanging wall, a 2 ft. or 30 in. bolt would be used,

although a maximum bolt of 6 ft. length could be used, and in coal mining, would be used.

The general rule may be laid down for rock mining, that the bolt used on any job should be long enough to penetrate a minimum distance of 1 ft. into the solid rock forming the anchorage strata.

## BOLTING WITH TIMBER

It is often the case that bolting can be used with timbering. Bolts are often used to replace the props or stulls used in normal mining, while the capping timbers and lagging are retained. It can be used to hold timber in place against walls or roof where the working place is too wide or too high to use conventional timber.

Examples of this may be seen in progress at the south end of the Broken Hill lode in N.S. Wales. Here, in a steep dipping reef, the ground frets and slabs considerably. The setups used hold the ground safely during the stoping operations, and until the section is sand filled.

The method has replaced square set stoping in a number of mines in addition to those at Broken Hill, with a considerable saving in timber and labour. It can be imagined the amount of timber saved in a stope 40 ft. in width, and when this timber has to be transported 400 miles the cash saving is considerable. In the stopes also there is much more flexibility, and room to move. Three drum scrapers can be used and all ground is open to inspection.

Drives can be protected from roof falls by cross timbers bolted in place, and carrying lagging between them. If the strata is inclined and one wall of the drive is inclined to fall, a similar method can be used to hold this wall in place. Many similar setups can be visualized. The timbering with the bolts amounts to an increase in the size of the bolt washer and the extension of the bolt pressure over a wider area.

## OTHER USES OF BOLTING

Bolting, with or without timber, has a number of uses in the mine. It can be used to strengthen corners and brows in the shaft, and also to strengthen the roof in wide openings such as shaft stations, underground hoist chambers and the like.

It can be used also in place of foundation bolts to hold down temporary installations such as small pumps and hoists, which do not warrant permanent concrete structures. It can be used in side walls to provide hinges for ventilation doors and for many similar types of work. The use of bolts with timber will hold up a weak hanging wall or a single slab thereof and bolting alone can be used to hold up a false hanging wall as long as the rock is not blocky or too badly fractured. A bolt pattern, similar to those used in coal mining would be used in this case. Where fractures do occur, they may be "laced" up by bolting to a pattern thereby preventing them from starting falls, which may spread through a stope.

Bolt holes are put in with the standard rock drill in use on the mine. This machine may also be used to drive the bolts by using a dolly to overcome the rotation of the machine. Alternatively a pneumatic hammer or an old rock drill with the rotation pawls removed may be used to drive the bolt. An impact pneumatic wrench is the ideal

way of tightening nuts, but if this is not available a standard spanner should be used with a predetermined handle length in order that sufficient leverage may be applied.

Bolts should not be used in soft oxidized ground. In this case there is no inherent strength in the rock itself, and neither has it any compressive strength to withstand wedge pressure at the anchorage. Bolts should not be used in blocky or highly fractured ground. Under these circumstances a block of ground can be unsupported between bolts and can fall away.

The third case where bolting should not be used, is where bedding or shearing planes at right angles to the strike of the reef. Here the wedge action tends to split the formation, and the bolt will not normally hold. Even if it does, it is doing no work in holding the strata together. Other cases do arise where local conditions make the use of bolts impossible. The main cases are, however, those stated.

### ADVANTAGES OF BOLTING

Most of the advantages have been mentioned previously above, but can be summarized again as follows:

1. **Saving in Cost:** This is very definitely the case in Australia, where labour and timber are expensive. The cost difference between conventional timbering and bolting would not be so great in Rhodesia.
2. **Saving in Labour:** Bolting on the metal mines is often carried out by the mining gang as part of their normal duties, and using their normal equipment. Possibly one

additional labourer is required in place of the standard timbering gang.

3. **Freedom of Movement:** By removing the forest of props often required, the use of bolting gives much greater freedom of movement for men and machinery. Often this will improve ventilation also.
4. **Greater Ore Extraction:** Either on its own or with timbering this method of support can do away with, or reduce the number of, pillars, thereby increasing the percentage extraction of ore.
5. **Greater Reliability:** Using standard specification steel for the bolts there is little likelihood of failure, and with standard patterns less likelihood of overloading.

The applicability of roof bolting or suspension roof supports has proved to be much greater than was first visualized. It is a method of support which can be adapted to a number of conditions occurring in Rhodesia, where it can be used to conserve timber as well as give the advantages already quoted. It is probably only suitable for the medium and larger mines of the Colony where European supervision is available, but here it can save a worthwhile number of native labourers.

A final warning must be given that care must be taken in the early stages of its use on any property. Local conditions must be studied and experimental work carried out to ascertain the proper methods of use. Until the mine management is satisfied with the experimental work the bolting should be used in addition to normal support, and not in place of it.

## Exportation of British Mining Machinery to South-East Asia

The following article, condensed from a report appearing in *Eastern World*, Vol. 7, No. 4, underlines the support given by United Kingdom manufacturers to the economic development of countries of South-East Asia. Although the article deals initially with the values of those goods exported for industry generally, it concludes by presenting a résumé of the values of those equipments exported for mining use.

It has been shown by an analysis of United Kingdom export statistics, that the exportation of British capital goods to South-East Asia has undergone an increase. For the purpose of a brief survey of the position, seven classes of goods important for the development of the national economy of the countries concerned are being considered. These goods in order are: iron and steel as well as manufactures thereof; cutlery, hardware implements and tools; electrical goods and apparatus; machinery; chemicals, drugs and dyes; and vehicles, including locomotives, ships and aircraft.

During the years 1951 and 1952, the value of these exports to South-East Asia represented 14 per cent of the total exported value of these goods from the United Kingdom, and in the latter year amounted to 65 per cent of the total United Kingdom exports to the South-East Asian countries concerned. The following table shows the trend of increased United Kingdom exports to South-East Asia for the last three years:

	1950	1951	1952
(All figures in £000,000)			
India	80.0	89.8	87.5
Pakistan	23.7	25.5	30.7
Ceylon	9.6	13.6	15.9
Malaya	25.8	43.1	44.9
Burma	4.0	6.0	7.7
Thailand	4.9	8.0	10.0
Indonesia	6.0	8.0	12.7
Total	154.0	194.1	209.3

A slight individual reduction of exports occurred only in the case of India, although a more detailed analysis proves that British exports to India of capital goods, which are

included in the tabulated total, were higher last year than in 1951. In detail, it is revealed that electrical goods and apparatus were exported at value £6,600,000 in 1950, £8,000,000 in 1951 and £11,400,000 in 1952. Machinery and parts exported totalled values of £36,000,000 in 1950, £34,200,000 in 1951, and £35,600,000 in 1952.

### DEVELOPMENT IN THE MINING INDUSTRY

The development of coal, iron ore and other mining industries of South-East Asia is a vital factor in progress, and efforts have been made in the last few years to develop natural resources. The British mining machinery industry, which in the post-war period faced the task of re-equipping Britain's coal industry, increased its total exports and the exports to the East, as is shown in the following table of U.K. mining machinery exports during the last three years.

	1950	1951	1952
	£	£	£
U.K. Total Exports	4,637,179	4,966,710	5,017,523
Inclusive to Australia	463,200	556,393	623,931
Inclusive to India	294,034	387,617	418,436
Inclusive to Malaya	258,160	469,179	350,276

In January, 1953, U.K. mining machinery exports to India increased to the value of £36,971 as against £29,802 in January, 1952. In addition, exports to India in 1952 included machinery being valued at £1,000,000, metalworking (including boring drilling) machine tools, valued at £1,300,000, portable power tools valued at £200,000 as well as hand tools.

During the last twelve months there were substantial increases in rupee payments for the mining machinery imported into India.

# Problems of the Mexican Mining Industry

Writing under recent date, a correspondent in Jalisco, Mexico, points out in the following article that a State Department having technical, administrative and fiscal control of the Mexican mining industry as a whole is regarded in some quarters as the only remedy capable of solving the many complex problems facing the nation's mining industry. It is indicated that solution of the financial problems is regarded as the most important step to terminate the industry's troubles, and that Governmental interest has been aroused.

The only workable remedy to solve the multiple problems of the Mexican mining industry, according to the National Federation of Mining Associations of Small Operators, is the creation of a new State Department which would have charge of technical, administrative and fiscal aspects of the industry as a whole.

Mine operators have worked out a basic project which has been submitted to President Adolfo Ruiz Cortines, incorporating in it recommendations made during the recent convention of the Federation from January 15 to 17 in Mexico City.

In the "petition" which asks for reforms of the laws covering Secretaries and State Departments when creating "Department of Mining," miners have itemized the causes which are retarding development of an industry which produces approximately \$700,000,000 pesos (\$81,014,000).

The natural exhaustion of mines, with many having a history of more than 300 years of continuous exploitation, and a "mistaken" fiscal policy which is "squeezing" investments makes it virtually impossible to interest new funds in exploitation of new mineral deposits. These are the two chief "brakes" to mining progress in Mexico to-day.

The proposal for the creation of a federal entity and unrestricted aid from the Government was submitted to Secretary of Economy, Gilberto Loyo, for study. It was pointed out that the mining industry has played an important role in the economic progress of Mexico, creating new commerce and cities such as San Luis Potosi, Guanajuato, Zacatecas, Santa Eulalia, Chihuahua, and many others.

## AID FOR THE MINING INDUSTRY

Moves to aid the ailing mining industry have already been begun by the new administration, with special attention being paid to small mine operations. The Department of Treasury and Public Credit has named a joint commission—made up of official technicians and representatives of mining associations—to seek a solution of the problems. The Government, it is believed, intends to give every aid possible to put the entire mining industry on its feet financially. Admittedly, this will take some time, but at least the inaction of the past has been broken.

From unusually reliable sources it is known that President Cortines already has received suggestions to end the troublesome mining question. This source insisted that a policy of "what is produced in Mexico shall be for Mexico" will be followed. Actually, for many years past, Mexican minerals have been exported in major part to foreign markets, and especially the United States. Statistics show that from 50 to 60 per cent of zinc, lead, silver, copper, antimony, bismuth and other mining products have gone to the U.S. for refining.

Not only has Mexico retained only a small part of its mining resources, including iron, but she also has had to pay freight charges for moving minerals as well as export taxes required by Mexico and import duties by the U.S. Metal processing plants in the U.S. have received Mexican ores without other than tonnage costs.

The most important step to end mining troubles is financing and President Cortines is preparing reforms that will not burden the nation's economy or require credits from foreign sources. The Official Diary of the Government, on September 18, 1952, authorized the exportation of iron ore,

contrary to expert opinion that exports should not be permitted because Mexico was "poor" in this ore, although having large unexploited reserves.

Now, it is understood, President Cortines will still permit iron exports but in the form of "iron for iron." In other words, Mexico will ship iron ore to the U.S. and other foreign markets in return for machinery. The actual exporter will be the Federal Government, with negotiations through the Bank of Mexico or another official organization, so that shipments and sales of iron can be strictly controlled. This policy of machinery and heavy industry equipment instead of dollars for iron will be widely expanded in the next few years.

Meanwhile, the President has also received a full report on mining resources in the State of Oaxaca, and the expectation is that large-scale exploitation of gold, silver, iron and tungsten mines is not too far off. Although shrouded in official secrecy, it is claimed that at least three uranium deposits have been located in the State and large quantities of sulphur. In the Tlacolula and Paríán region are large tungsten deposits and the richest antimony deposits have been found in Tlaxiaco, with manganese in Paríán.

Oaxaca also has large mica deposits—these were exploited during the war but since then abandoned. While gold and silver veins have been found in abundance the only operating mine is Natividad, with a reduced strength of around 500 miners. There is gold and silver in the Ocotlán area and some in the Tabiche zone.

Now with increases in the official price of gold rumoured, this would have an immediate effect on Bank of Mexico reserves and would also stimulate mining activity in Oaxaca as well as throughout the Republic. It should be pointed out that some years ago weekly salaries paid in the Ocotlán and Tabiche regions of Oaxaca came to \$4,000,000 pesos (or almost \$1,000,000).

## HOPES FOR THE FUTURE

Plans are in progress for large-scale operations in Oaxaca and prime need is for smelters and ore processing plants. Plants capable of handling at least 25 tons a day are needed but in the past the outlay of \$250,000 has been beyond the reach of operators. Now, under the new law which permits foreign participation up to 49 per cent in new mining ventures, the industry views the outlook hopefully.

The Governor of the State of Oaxaca as well as federal authorities would like to see an upswing in mining activity and there may be official effort now to reduce taxes and open new credits and much-needed roads so that exploitation can move forward. Oaxaca mining interests claim that gold mining operations alone would yield from two to three tons of gold each month.

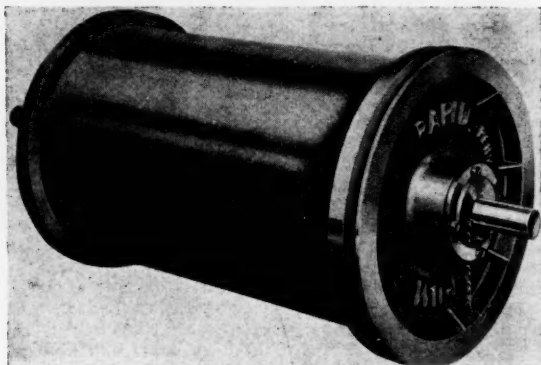
The recently inaugurated wide-gauge Oaxaca railroad is a step forward in solving transportation problems but more mine to main highway roads are required plus a more liberal federal attitude in the matter of taxation, as well as granting of credits, before the promise of a new mining age in the State can become an actuality. President Cortines promised aid in his pre-election campaign and he seems to be one politician who plans to keep his promises. Some optimistic feeling is expressed that in the next six-year period the Mexican mining industry will at last break the crippling shackles that have hampered progress during the past years.

## MACHINERY AND EQUIPMENT

The British Industries Fair, 1953, opened on Monday of this week at Olympia, Earls Court, and Castle Bromwich, Birmingham, with those exhibits of particular interest to the mining industry being displayed at the latter venue. During the past month in these pages, *The Mining Journal* has presented previous notes of those equipments to be displayed which it was felt would provide special attraction to visitors connected with the mining industry, and in this issue we complete the series with several final notes of equipments which at time of writing are being exhibited on the stands.

### A Range of Magnetic Separators

The products of Rapid Magnetic Machines Ltd. are displayed on Stand C 421, Castle Bromwich, at this year's British Industries Fair, and include electro and permanent magnetic equipment for all purposes. Lifting and suspension magnets are being shown, as well as magnetic clutches and brakes, and separators for wet and dry purposes, overhand type separators



The Permaflux Drum Type Separator

and portable foundry separators. The type OG separator is on display, a unit which has a marked value in the mining industry, utilized for the selective separation of up to six closely related feebly magnetic minerals in one passing.

Among other pieces on display is the Rapid Patent Permaflux Drum type separator, used for the extraction of tramp iron from a wide variety of materials. This equipment is presented as being self cleaning and various sizes are available for new or existing plants.

In the operation process, the material for treatment falls directly onto the revolving drum, which incorporates a stationary multipole non-electric magnet system of high intensity. On entering the magnetic field, the prevalent ferrous steel content is arrested and automatically discharged out of the flow, the latter falling in normal trajectory.

### A Low-Loader for Surface Use

A small transporter that may prove capable of playing an interesting role in surface duties within the mining industry is the Opperman Low-Loader Motocart which will transport freight weighing  $1\frac{1}{2}$  tons during a day's operations on  $1\frac{1}{2}$  gallons of fuel. It can be visualized as being ideal for such work as timber yard transportation, or such duties as the speedy haulage of drills and steels from shop to shaft and like smaller equipments movement.

The Motocart is composed of a light, all welded steel chassis, a sturdy and large traction wheel with 8 h.p. air cooled engine and four speed and reverse gearbox. These components are all set on the same rigid mounting. The whole is completed by Marles steering, Girling brakes, and an elastic choice of bodies. The unit weighs 30 cwt. and is available as tipping and non-tipping standard models or Lincoln tip cart.

The standard model, with loading floor above the back wheels, thus presents a loading platform 2 ft. 11 in. above the ground and a rear area of 8 ft. by 6 ft. 5 in. The All Steel Low-Loader, on the other hand, has the loading container between the wheels, and presents a loading platform only 17 in.

above the ground offering an area of 8 ft. length by 4 ft.  $9\frac{1}{4}$  in.

The unit is presented by the manufacturers, S. E. Opperman Ltd., as being highly manoeuvrable, and an external control allows the operator to move the machine while actually outside the driver's seat.

### Industrial Electric Motors

On Stand C613/512 at Castle Bromwich, The English Electric Co. Ltd. is featuring three lines of industrial motors at this year's British Industries Fair. These include the LY standard range; flameproof XLK motors, and KKS crane and hoist motors.

The LY motor range meets the new British Standard for totally enclosed, fan-cooled, squirrel-cage motors, complying with the B.S.I. Draft Specification CN (ELE) 6814. The second line covers flameproof motors, two of which are shown and the third group is also represented by two machines. An interesting range of fractional horse-power motors from  $\frac{1}{4}$  to 1 h.p. is shown, including 230/250 V and 400/440 V designs.

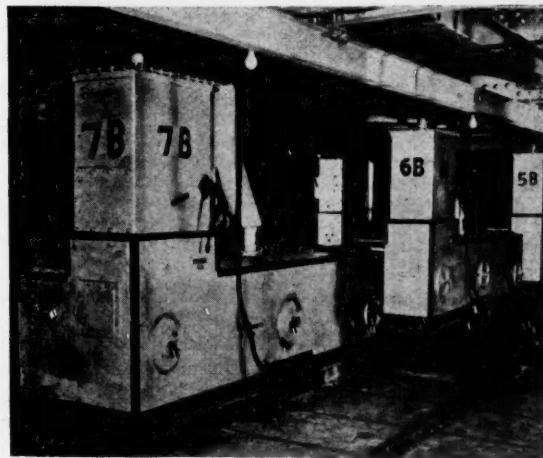
Fusegear and switchgear are prominently displayed. The Superform distribution fuseboard, examples of cubicle construction, and a comprehensive range of fusegear equipment, are among the exhibits. Switchgear displayed shows a class F600 switchboard, incorporating type "OB" air circuit-breakers and combination fuse switches, a typical medium voltage switchboard suitable for industrial installations.

The Mining Division shows a working model of a miniature depth indicator, for use with a geared A.C. winder with twin motors, each rated at 1,980 h.p.

### Dust Recovery Operations at the Copper Cliff Smelter

The dust content of the exhaust gases from the copper-nickel smelter owned by the International Nickel Company of Canada, Ltd. at Copper Cliff, Ontario, amounts to some hundreds of tons daily. Yet, only a small percentage of this goes to waste as the dust is treated in a Cottrell precipitation plant to extract the nickel and copper remaining in it. This treatment of what would otherwise be waste material, makes an important contribution to the high efficiency of the smelter.

The gases from the batteries of roasters and converters in



Protector Boxes in the Treater Section

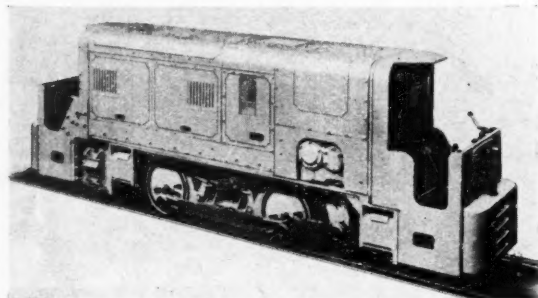
the smelter are passed into huge flues in the treater section of the Cottrell plant. Twisted-wire curtains charged to a potential of 60,000 volts ionize the dust particles so that they are attracted to the earthed 22 ft. rods which act as collecting electrodes. The gases, now free of dust particles, pass on to the 500 ft. smoke stack and are discharged into the atmosphere. Once each shift power is switched off in each unit of the treater section and the rods are tapped by pneumatic hammers to knock off the dust, which falls into bins. The dust is then carried by conveyor to a shooting tank, whence it is blown

through pipes to the reverberatory furnace and so re-enters the smelting process.

Power for the Cottrell operation is received at 550 volts A.C. and is transformed and rectified to give the 60,000 volt D.C. supply for the precipitator. Coils attached to both sides of each rectifier prevent interference with radio reception in the area. All openings giving access to high tension equipment are fitted with automatic earthing switches to protect workers from the danger of possible contact with live parts. A constant watch is kept on the temperature of the gases as they pass through the treater and heat from the reverberatory furnace boilers is used to maintain the temperature above the point at which acid condensation would occur and cause corrosion.

#### Flameproof Locomotives for Underground Haulage

Interesting pamphlets from Ruston & Hornsby Ltd. present the wide range of diesel locomotives constructed by these manufacturers for service underground in many parts of the world. Fully flameproof mine locomotives are catalogued under the models symbols 20 DLG, 30, 40 and 48 DLG, and



The Mark LHG 75 h.p. 10 ton Flameproof Locomotive

48 DLZ, LHG and 100 DLG. These units range from 3.5 tons weight (20 DLG) to 15 tons weight (100 DLG). Minimum-maximum gauges rise from 1 ft. 6 in. to 3 ft. 6 in. in the 20 DLG to 2 ft. 6 in. to 3 ft. 6 in. in the 100 DLG. Each unit, except the LHG has three loco speeds ranging from 2.625 m.p.h. to 12.5 m.p.h. The LHG has four locomotive speeds. Tractive effort in first gear is graded from 1,750 lb. in the 20 DLG to 7,850 lb. in the 100 DLG. The LHG model has a tractive effort of 5,600 lb.

It is interesting to note that the 75 h.p., 10 ton LHG machine was introduced and presented by the manufacturers as having promoted a new feature in underground diesel design; the fact that it was equipped with a driving position at each end.

A range of naked flame mine locomotives, named 20 DLU, 30, 40 and 48 DLU, LHU and 100 DLU are characterized by almost identical statistics to those mentioned in connection with the DLG group.

#### A Selection of Electrical Products for Industry

On Stand C511/410 at the British Industries Fair, Castle Bromwich, The British Thomson-Houston Co. Ltd. is displaying a range of products for use in industry. These exhibits range from an 11 kV., 250 MVA switchgear unit for power station and industrial service to industrial electric heaters and fractional h.p. motors.

Working demonstrations include the switchgear mentioned, a new design of alternator with close voltage regulation, the "Stacreep" crane control, a high-speed electronic batch counter and sectional motors running under their own power. There is a comprehensive display of Mazda lamps and lighting for domestic, commercial and industrial applications.

Representing the range of equipment made by the company for electric and diesel-electric locomotives is a scale model of a 400 h.p. diesel-electric shunting locomotive. The regular and important part played by the company in the design and manufacture of heavy plant for the steel industry is shown by a large diorama of the main drives totalling some 28,000 h.p., designed and built by British Thomson-Houston, for the Abbey Works of the Steel Company of Wales, and a photographic display indicating how electric equipment contributes to the processes of steel production.

#### Mobile Units at the B.I.F.

Jack Olding and Co. Ltd. exhibit the Vickers VR 180 tractor and its matched ancillary equipment on Stand 1347/1246, Castle Bromwich, at this year's British Industries Fair. Other equipments on the stand include a wide range of Onions equipment, the Galion motor grader, Hendrix dragline buckets and such units as the Elstree heat planer and Barber-Greene Olding Standard Finisher, the Junior Finisher and the 44 C Vertical Boom Ditcher. Certain of these equipments have received previous mention in *The Mining Journal*.

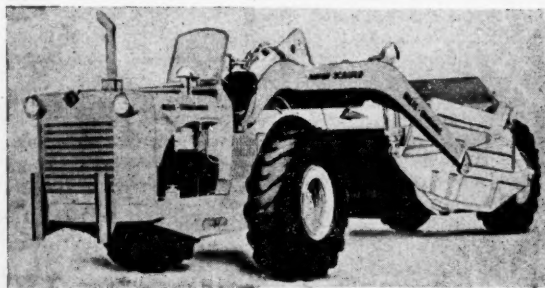
The Vickers VR 180 tractor is powered by a Rolls Royce supercharged six cylinder oil engine, and a number of these units have already been delivered to overseas territories. The equipment incorporates many new features in tractor design, has a fully articulated three-point suspension and a top speed of 9.73 m.p.h. The VR 180 is manufactured by Vickers-Armstrongs who, together with their associated company Onions, produce the ancillary equipment for the tractor.

Other equipment shown on the stand includes Onions scrapers, rippers and power control units, such as the 3 cu. yd. Model A scraper, the model EK 9 cu. yd. scraper and the LR and TR rippers for tractors between 60/70 and 100/150 h.p. respectively. The Galion model 118 extra duty motor grader is also on display.

#### A Series of Earth Moving Equipments

Mackay Industrial Equipment Ltd. are sole concessionaires in the U.K. for Allis-Chalmers industrial tractors, and the company announces that the Allis-Chalmers line of tractor-scraper-grader units has been extended by the addition of the motor scrapers and wagons formerly manufactured by La Plant Choate. Mackay of Feltham announce that through an agreement with John Blackwood Hodge & Co. Ltd., spares and service for La Plant Choate scrapers and equipments already operating in this country will be handled by the Blackwood Hodge organization.

The Allis-Chalmers TS 300 motor scraper has a struck capacity of 14 cu. yd. and a heaped capacity of 18 cu. yd. The TS 200 model has capacities of 10 cu. yd. struck and 13 cu. yd. heaped. The motor scrapers are two-wheeled, high speed, rubber tyred tractors flexibly joined to a two-wheeled and rubber tyred scraper to form a four-wheeled and self-propelled unit. Both have a pedestal hitch assembly connecting tractor and scraper which combines a vertical and horizontal pivot to allow complete flexibility in rough terrain. These motor tractors are steered hydraulically by two double acting rams.



The Allis-Chalmers TS 200 Motor Scraper

The TS 300 has a positive forced-ejection type scraper that is operated by an air actuated cable control unit mounted on the rear of the tractor, driven directly by the engine through the countershaft of the transmission. Raising and lowering of the TS 200 bowl is accomplished by two double-acting rams suspended from the top inside corners of the main frame and connected to the front corners of the bowl. Down pressure can be exerted on the cutting edge when working in extremely tough material. The TS 200 front apron is controlled by a ram and cable arrangement, with the ram mounted directly behind the main frame cross member. Initial movement of the apron is accomplished through the travel of this ram. As the jack completes its stroke, the ejector ram at the rear is activated and as the ejector moves forward, the apron opening is completed through a link arrangement. Both the TS 300 and TS 200 are powered by either a Cummins or Buda Diesel engine.

## METALS, MINERALS AND ALLOYS

This week has seen a halt in the general fall in metal prices which, after the prolonged decline in free markets, naturally has meant some rebound. The more optimistic sentiment has been assisted by the recognition that prices in some instances may have reached a point when high-cost producers may close down, or at any rate, restrict output. Another consideration is perhaps the reflection that however favourable recent developments in the international situation *vis-a-vis* Russia and China may be, their affect in the way of curtailing demand for armament materials can hardly be experienced for a considerable time. Naturally a check in the general fall was bound to come but whether it is merely a halt on the way down to bottom, or the bottom itself, time alone can show. The influence of the London Metal Exchange has asserted itself strongly as America has closely followed London in the uncontrolled metals.

Increasing heat appears to be developing over the future tariff policy of the United States. This is particularly reflected in the hearings of the Simpson Bill which seeks to establish a sliding scale of duty for imports of metals and minerals. President Eisenhower is anxious for a year's continuance of the present set-up but this compromise does not seem to commend itself to the proponents of increased tariff and the current impression in the States seems to be that the Administration is not very sure of its ground. Mr. Simon Strauss, of A. S. and R., has expressed himself strongly in favour of a more liberal policy while Mr. Otto Herres, chairman of the National Lead and Zinc Committee of the Western States Council, has strongly opposed the brief presented by the American Metal Company and others. While the issue remains undecided the trend of the United States prices are bound to be uncertain.

The Economic Commission for Asia and the Far East has decided on a six-point plan to develop the mineral resources of that area of the world. It is interesting to see that Russian delegates participated in the deliberations.

**COPPER.**—Copper prices have trended lower since our last issue with 29½ c. per lb. for electrolytic generally quoted in New York. Foreign refined electro was offered as low as 28 c. c.i.f. New York without attracting business, and the metal has been talked down to 25 c. by the end of the year, which is within measurable distance of the price at which import duty would again be levied.

At the end of last week the Ministry of Materials dropped their selling price from £280 to £253 per ton (American parity about 31½ c.). In future, the Ministry will base its price on the New York average quotation either for the week or the month. Recent prices in the open market have been around £240, c.i.f. West Continent.

**LEAD.**—A firmer tone has characterized the lead market both here and in the United States and prices have advanced some £5 a ton on the Metal Exchange. In New York the price advanced to 12½ c. on Wednesday. The U.S. domestic output was lower in February at 29,297 s.tons, but this was due to the shorter month. The United States Smelting and Refining Company has decided to work a five-day week starting on May 2. American demand became heavy with the rise in price.

**TIN.**—Tin has recovered some £20 per ton since last week and in the U.S. after reports of sales for July earlier at 90-91 c. recovered to 96 c. for spot on Tuesday. In Malaya there was in the first quarter of the year no evidence of declining output, the production being 14,047 tons for the first quarter of 1953 compared with 13,904 tons in the same period last year. Encouraged possibly by the impression that the United States delegates at the recent Conference in London were not indisposed to consider some form of international support for prices, opinion in Malaya seems to favour measures to support the price of tin and rubber and confidential negotiations are reported to be on foot.

Bolivian exports in February were reported as 1,698 tonnes making, with the January figure, 3,191 tonnes compared with 4,491 tonnes for the same period of 1952. Mines formerly owned by Patiño contributed 1,296 tonnes and those of the Hochschild group 6 tonnes. 175 tonnes came from medium and 221 from small mines.

**ZINC.**—Zinc improved on the London market over the week by some £4 a ton, with the tone becoming very firm. The American market also stiffened, though the price was unchanged at 11 c. The annual meeting of the American Zinc Institute opened on Monday. The outlook for production at current market level was very pessimistically regarded. Moreover the growing competition of the newer metals was bound to make expansion difficult. One speaker expressed the view that production and consumption in Europe were now not far out of balance, estimating consumption at 660,000 s.tons.

**ALUMINIUM.**—General Services Administration in Washington has decided to resume buying for the stockpile after eighteen months' suspension. This reflects improvement in supply, though producers were opposed to more stockpile buying. Output in the United States continues to forge ahead; the output in January was 89,895 s.tons the highest rate for recent years. Aluminium Limited has arranged contracts for delivery into the U.S. of some 275,000 s.tons of aluminium for the period 1953-9. It has also undertaken to deliver 1,275,000 s.tons of bauxite during the same period. At the ninth meeting of the Metal Powder Association, one speaker said that aluminium powder is being produced in larger tonnage to-day than any other metal powder; volumetric production of primary aluminium already exceeded the production of every metal except iron and steel.

**ANTIMONY.**—Imported antimony has become a keen competitor in the United States with American brands, being offered at 26-27 c. per lb. duty free compared with 34.5 and 35 c. per lb. for Texas material.

**MAGNESIUM.**—Following the announcement in last week's issue of the projected closing of three of the U.S. government's magnesium plants it has now been decided to take five out of service, leaving only the Velasco plant operated by the Dow Chemical Company in commission. This works derives its magnesium from sea water. It is estimated that the works will yield some 40,000 s.tons a year of magnesium with privately owned concerns contributing some 28,000 s.tons.

**MANGANESE.**—The Minister for French Overseas Territories has approved of a proposed contract for the development by United States Steel of the manganese deposits in Gabon. This project was referred to in our issue of April 17, page 455. The deposit is estimated to contain 50,000,000 tons of 40-50 per cent grade.

**NICKEL.**—Speaking at the annual meeting of International Nickel, which is reported on page 520, Dr. Thompson said that present Government restrictions on end-uses of nickel had, except in special cases, temporarily stopped effective development of new uses of nickel. "Some of our peace-time markets have been lost, but only temporarily," he said. "Some may have been permanently diminished or even permanently lost. But we will discover new fields and certain uses, at present small, will be greatly expanded as the preparedness demand decreases." Despite previous expectations to the contrary the mining of Inco's open pits will continue beyond the end of the year as it will be practicable to mine more ore from the surface than they had previously anticipated. Referring to reports of nickel ores at Mystery Lake in Northern Manitoba, Dr. Thompson said their investigation was still in the preliminary stages and all that had been determined was the presence of a large low-grade nickel deposit, non-commercial under present conditions.

Referring to the copper outlook Dr. Thompson noted that some concern has been expressed that the market would be unable to absorb the expected enlargement of world copper production, another of the company's principal products, in the face of increasing competition from aluminium, stainless steels and similar materials. "My experience with this type of competition," he added, "is that in the long run good development and sales efforts of any one commodity tend to expand the markets for all."

## Iron and Steel

The end of the steel shortage is in sight. Record outputs from home sources, increased imports of foreign steel and the limitation of exports have all contributed to the improvement in the volume of deliveries to British consumers and the only type of steel which remains seriously deficient is steel plate. A new organization has been set up on a voluntary level to supervise the distribution of plates, but the essential fact is that production has been stepped up considerably. Thus the Minister of Supply has been able to give the assurance that bigger tonnages of plate will be placed at the disposal of shipbuilders and certain important sections of the engineering industry.

In view of the extent and the urgency of the home demand for steel it is not altogether surprising to find that exports during the first quarter of this year only very slightly exceeded the tonnage shipped in the corresponding period of 1952. Imports in the same period have jumped from 389,500 to 544,900 tons, Austria contributing over 100,000 tons to this latter total and the U.S.A. over 85,000 tons. Quite clearly we have not yet reached the stage of self-sufficiency.

There is, however, every prospect of a steady rise in the volume of steel exports. As a prelude to the opening of a common market for steel in the Schumann countries on May 1, Continental prices have taken an upward trend, and although Belgian merchant bars are still cheaper than British, the margin has narrowed considerably whilst other British steel products are quoted well below European levels.

Blast furnacemen are hard pressed to keep pace with the heavy calls for basic and haematite iron but can easily cope with the requisitions for foundry iron which are on a reduced scale owing to the recession in the demand for castings. Arrivals of foreign ore barely balance the heavy consumption at the blast furnaces and first-class furnace coke is also in short supply. On the other hand receipts of both home and foreign scrap are on a somewhat better scale.

## The London Metal Market

(From Our Metal Exchange Correspondent)

As a result of negotiations between the Government and the Rhodesian copper producers, the Ministry of Materials' selling price for Electro was reduced from £280 to £253 per ton on the 25th instant. Consumers had been holding off, and although there may be some buying to be done in the near future, it is expected that buyers will continue their cautious policy until after the re-opening of dealings on the London Metal Exchange in view of the uncertainty as to the level at which prices will settle down. The London market cannot commence operations until August at the earliest, and in the meantime 29½ c. per lb. is being quoted by the Customs smelters in America.

Tin has been rather less active, but there has been a sharp recovery from the low levels reached recently both here and in the East. This may have been brought about partly by doubts as to the speedy conclusion of the armistice talks in Korea in a satisfactory manner. There was some activity in the American market but at very poor prices, although some improvement has since been shown there in sympathy with the rise in the Eastern market. The Eastern price on Thursday morning was equivalent to £735½ per ton c.i.f. Europe.

Both the lead and zinc markets here have shown some recovery, the recent low prices having attracted a little more consumer buying. There are signs that if the low prices should continue for any length of time production in some directions may be curtailed.

Closing prices and turnovers for the week are given in the following table:—

	April 23		April 30	
	Buyers	Sellers	Buyers	Sellers
<b>Tin</b>				
Cash.....	£695	£700	£715	£720
Three months.....	£682½	£685	£710	£715
Settlement.....	£695		£715	
Week's turnover....	595 tons		550 tons	
<b>Lead</b>				
Current month.....	£73½	£74	£78½	£79
Three months.....	£72½	£72½	£77½	£78
Week's turnover....	5,500 tons		5,700 tons	
<b>Zinc</b>				
Current month.....	£63½	£63½	£67	£67½
Three months.....	£64	£64½	£67½	£68
Week's turnover....	5,550 tons		5,700 tons	

## U.K. METAL & MINERAL IMPORTS—MARCH 1953

	Units	March 1953	Jan.-Mar. 1952	Jan.-Mar. 1953	Increase or decrease in 1953 over 1952
<b>Non-ferrous metals and manufactures:</b>					
Aluminium and alloys..	Cwt.	116,834	851,485	627,883	-223,602
Bismuth*	Lb.	67,510	156,892	104,175	-52,717
Cadmium**	Lb.	41,503	522,640	129,322	-393,318
Cobalt and Alloys**	Lb.	299,084	809,941	1,014,588	+204,647
Copper Electrolytic	Cwt.	246,895	1,016,640	1,042,827	+26,187
Other sorts	Cwt.	165,039	800,040	631,716	-168,324
Lead	Cwt.	200,960	1,262,940	706,145	-556,795
Mercury	Lb.	213,101	236,525	448,892	+212,367
Nickel	Cwt.	16,970	27,614	42,682	+15,068
Tin	Cwt.	5,107	39,820	13,549	-26,271
Zinc	Cwt.	350,605	1,006,100	1,092,474	+86,374
<b>Ores and Concentrates:</b>					
Antimony ore and conc.	Tons	725	7,406	2,070	-5,336
Bauxite	Tons	23,109	65,178	81,378	+16,200
Chromium ore	Tons	17,360	49,223	42,525	-6,698
Iron Pyrites†	Tons	20,888	69,054	67,124	-1,930
Manganese ore	Tons	50,231	126,093	137,600	+11,507
Molybdenum ore	Cwt.	10,886	18,574	17,886	-688
Nickel ore, conc. & matte	Tons	1,894	6,245	7,904	+1,659
Tin ore and conc.	Tons	5,148	13,422	7,481	-5,941
Titanium: Ilmenite	Tons	9,400	32,544	24,682	-7,862
Other sorts	Tons	465	2,422	1,418	-1,004
Tungsten ore	Tons	337	1,467	1,740	+273
Zinc ore and conc.	Tons	1,501	42,550	54,231	+11,681
<b>Non-metallic mineral products:</b>					
Asbestos	Tons	8,922	23,022	22,762	-260
Magnesite	Tons	1,357	6,291	3,243	-3,048
Sulphur	Tons	21,299	107,647	54,646	-53,001

\*Excluding bismuth alloys.

†Including cupreous iron pyrites.

\*\*The figures for 1953 are not completely comparable with those for previous years.

## APRIL 30 PRICES

### COPPER

Electrolytic .. .. . £253 0 0 d/d

### TIN, LEAD AND ZINC

(See our London Metal Exchange report for Thursday's prices)

### ANTIMONY

English (99%) delivered,  
10 cwt. and over .. .. £225 per ton  
Crude (70%) .. .. £210 per ton  
Ore (60% basis) .. .. 20s. — 22s. nom. per unit, c.i.f.

### NICKEL

99.5% (home trade) .. .. £483 per ton

### OTHER METALS

Aluminium, £161 per ton  
Bismuth (min. 4 cwt. lots) 17s. lb.  
Cadmium (Empire), 14s. 4d. lb.  
Chromium, 6s. 5d./7s. 6d. lb.  
Cobalt, 20s. lb.  
Gold, 248s. f.oz.  
Iridium, £60 oz. nom.  
Magnesium, 2s. 10½d. lb.  
Manganese Metal (96%-98%) £280/£295  
Osmiridium, £40 oz. nom.  
Osmium, £65/70 oz. nom.  
Palladium, £7 15s./£8 10s. oz.  
Platinum, £27/£33 5s.  
Rhodium, £42 10s. oz.  
Ruthenium, £25 oz.  
Quicksilver, £70 10s./£71 ex-warehouse  
Selenium, 30s. 6d. nom. per lb.  
Silver 74d. f.oz. spot and f'd.  
Tellurium, 15s./16s. lb.

### ORES, ALLOYS, ETC.

Bismuth .. .. 50% 7s. 9d. lb. c.i.f.  
40% 6s. 9d. lb. c.i.f.  
Chrome Ore—  
Rhodesian Metallurgical (lumpy) £14 18s. per ton c.i.f.  
" (concentrates) £14 18s. per ton c.i.f.  
" Refractory £14 10s. per ton c.i.f.  
Baluchistan Metallurgical .. £16 11s. 6d. per ton c.i.f.  
Magnesite, ground calcined .. £26 - £27 d/d  
Magnesite, Raw .. £10 - £11 d/d  
Molybdenite (85% basis) .. 103s. 10½d. per unit c.i.f.  
Wolfram (65%) .. .. World buying 310s. - 320s.  
" .. 352s. 6d. Selling  
Scheelite .. .. World buying 290s. - 300s.  
" .. 342s. 6d. Selling  
Tungsten Metal Powder .. 25s. 9d. nom. per lb. (home)  
(for steel manufacture)  
Ferro-tungsten .. .. 22s. 10d. nom. per lb. (home)  
Carbide, 4-cwt. lots .. £35 13s. 9d. d/d per ton  
Ferro-manganese, home .. £49 15s. 0d. per ton  
Manganese Ore U.K. (48%-50%) .. .. 6s. 1d. per unit  
Brass Wire .. .. 2s. 7½d. per lb. basis  
Brass Tubes, solid drawn .. 2s. 1½d. per lb. basis

# THE MINING MARKETS

(By Our Stock Exchange Correspondent)

Market conditions generally were rather quiet this week. Gilt-edged were under the shadow of the large loan recently issued and which opened at  $\frac{1}{2}$  discount. In addition, there is some £4,000,000 of new industrial debenture stock overhanging the market.

Kaffirs were rather uninteresting. On a small trickle of selling, prices mostly fell away. There was a small rally towards the end of the period encouraged by the South African Minister of Lands' speech concerning reasonable taxation of gold mines. The West Rand Consolidated quarterly figures caused considerable disappointment. The net profit from uranium was £138,304 compared with £124,707 in the December quarter. Market circles had been anticipating more sensational results. This news cooled off the recent sharp rise in many other uranium shares. The West Driefontein quarterly figures were very favourably received and the shares rose in value against the general trend. The company still reports 100 per cent payability and higher values. The profits for the March quarter were well up on December. The Blyvoors results were also satisfactory and West Rand shares generally showed resistance contrary to the run of the market. Witwatersrand Gold has given official notice of its intention to discontinue mining operations which are currently being conducted at a loss. Every effort will be made to save the mine from closing down.

The Freddie's group was sharply depressed after selling from Johannesburg. Most other shares were lower following the general pattern of the Kaffir market. The Virginia quarterly reef values were considered disappointing. Of 1,180 ft. sampled, 36 per cent was payable, averaging 235 in. dwt. By contrast, the Harmony results were well received although this did not prevent the easing of the share price. Of the very small footage sampled, 100 per cent was payable, averaging 580 in. dwt. No. 3 shaft reached a depth of 4,502 ft. The basal reef is expected to occur about 4,910 ft. Middle Witwatersrand hardened in anticipation of the quarterly report.

Among West African shares Ashanti fell away through lack

of interest. Offin River steadied around the current price of 1s. 3d. Kwahu improved to 4s. 3d. on details concerning the Mount Elliot scheme. The assets of the latter company comprise 233,523 shares in Esperanza Copper and Sulphur, 14,000 in Bisichi, and approximately £25,000 in cash, giving an estimated break-up value of 3s. 10d. per share.

Diamond shares were steadier after their recent fall and hardened in sympathy with the rally on Wall Street. Platinums turned easier. The free market in the metal is quiet. While there has been little change in the metal price, the supply position is reported to be definitely easier and buyers absent.

Coppers were all lower following the reduction of £27 a ton in the metal price. This is the first stage towards restoring free trading in the metal. Rhodesian Anglo American were rather steadier than the rest following the Wankie agreement.

Tin shares improved on the higher metal prices but interest was mainly centred on the Nigerian section. Here, details of the £250,000 made available to Gold & Base Metal Mines by the DMPA encouraged all columbite producers. Clearly, the Agency is still very much interested in the metal. Jantar were outstanding and Gold & Base also jumped.

Lead/zinc issues recovered from their recent low level owing to the better metal price. Prices had previously been marked down after the reduced interim dividends announced by North Broken Hill and Broken Hill South. Mount Isa also rose sharply, but San Francisco Mines gave way on misgivings concerning the coming dividend announcement.

Wankie Colliery were unchanged following the news that the management will change from Powell Duffryn (Rhodesia) to Rhodesia Anglo American. This alteration should benefit the copper belt consumers.

In the Canadian market the main base metal producers showed weakness. The Hudson Bay Mining and Noranda fell. The Canadian copper price has been lowered. Gold producers improved where changed.

FINANCE	Price April 29	+ or - on week	O.F.S.	Price April 29	+ or - on week	MISCELLANEOUS GOLD	Price April 29	+ or - on week	TIN (Nigerian and Miscellaneous contd.)	Price April 29	+ or - on week
African & European...	23	-1/2	Freddie's	13	-1/2	(contd.)	27/-	-1/2	Geevor Tin	9/6	.....
Anglo American Corp.	18/6	+3d	Freddie's S.	12/10	-1/3	St. John d'El Rey	25/-	-1/10	Gold & Base Metal	4/3	+6d
Anglo-French	25/-	-1/3	F. S. Geduld	3	-1/2	Zambesi	25/-	-1/10	Jantar Nigeria	14/-	+1/9
Anglo Transvaal Consol.	31/10	-1/3	Geoffries	17/6	-6d	<b>DIAMONDS &amp; PLATINUM</b>	4 1/2	.....	Jos Tin Area	13/-	+3d
Central Mining (£1 shrs.)	46/6	-2/6	Harmory	27/-	-6d	American Inv.	21/6	-1/3	Kaduna Prospectors	2/9	-3d
Consolidated Goldfields	25/-	-7/4	Lorraine	9/6	-6d	Cons. Diam. of S.W.A.	4	-1/2	Kaduna Syndicate	2/9	+3d
Consol. Mines Selection	3/6	-4d	Lydenburg Estates	7/9	-1/2	De Beers Deft. Bearer	61/3	-9d	London Tin	4/10	-1/4d
East Rand Consols	4 1/2	+7/4	Merriespruit	11/11	+4 1/2	De Beers Pfd. Bearer	14	.....	United Tin	2/6	.....
General Mining	7/6	-1/4	Middle Wits	39/4	-10 1/2	Pots Platinum	7/9	-3d	<b>SILVER, LEAD, ZINC</b>		
H.E. Prop.	60/9	-3/6	Osifits	23/6	-10 1/2	Watervaal	14/-	-xd	Broken Hill South	43/9	+2/6
Henderson's Transvaal	34	-1	President Brand	24/7	-9d	<b>COPPER</b>			Burma Mines	1/9	.....
Johnnies	32/6	-7/4	President Steyn	12/10	-1 1/2	Chartered	50/-	-2/2	Consol. Zinc	24/9	-9d
Rand Mines	41/-	-3d	St. Helena	14/3	-9d	Esperanza	4/-	.....	Lake George	10/-	+3d
Rand Selection	27/6	-1/6	Virginia Ord.	21/6	-9d	Indian Copper	4/6	.....	Mount Isa	33/9	+1/3
Strathmore Consol.	35/-	+1/2	Welkom	3 1/2	-1	Nchanga	3 1/2	-xd	New Broken Hill	18/9	+9d
Union Corp. (2/6 units)	46/10 1/2	+7 1/2	Western Holdings	1/6	-1 1/2	Rhod. Anglo-American	44/3	-1/6	North Broken Hill	50/-	.....
Vereeniging Estates						Rhod. Katanga	8/9	+1 1/2	Rhodesian Broken Hill	10/3	.....
Wits						Rhod. Katanga	12/9	-10 1/2	San Francisco Mines	21/3	-2/3
West Wits						Rhod. Katanga	16 1/2	-1	Uruwira	3/3	-3d
<b>RAND GOLD</b>			<b>WEST AFRICAN GOLD</b>			Rhod. Katanga	20 1/2	-1	<b>MISCELLANEOUS</b>		
Blyvoors	42/9	-6d	Amalgamated Banket	6/7 1/2	-1 1/2	Rhod. Katanga	20 1/2	-1	<b>BASE METALS &amp; COAL</b>		
Brakpan	10/9	-1/3	Ariston	22/9	-9d	Rhod. Katanga	20 1/2	-1	Amal. Collieries of S.A.	45/6	.....
City Deep	22/6	-1/3	Bibiani	6/3	+1 1/2	Rhod. Katanga	20 1/2	-1	Associated Manganese	41/3	-3d
Consol. Main Reef	26/3	-1/10	Bremang	2/4	+1 1/2	Rhod. Katanga	20 1/2	-1	Cape Asbestos	21/10 1/2	.....
Crown	33/1 1/2	-1/10	G.C. Main Reef	3/10 1/2	+1 1/2	Rhod. Katanga	20 1/2	-1	C.P. Manganese	54/9	-9d
Daggas	34	-6d	G.C. Selection Trust	6/10 1/2	+1 1/2	Rhod. Katanga	20 1/2	-1	Consol. Murchison	25/6	-9d
Doornfontein	26/3	-6d	Konongo	3/-	-xd	Rhod. Katanga	20 1/2	-1	Mashaba	7 1/2	+1 1/2
Durban Deep	43/1 1/2	-1/10 1/2	Marlburg	1/1 1/2	-1 1/2	Rhod. Katanga	20 1/2	-1	Natal Navigation	3 1/2	.....
E. Daggas	17/6	-1/3	Maun	3/4	-1 1/2	Rhod. Katanga	20 1/2	-1	Rhod. Monteleo	8/9	-9d
E. Geduld (4/- units)	36/10 1/2	-1/3	Taguuh & Abosso	3/4	-1 1/2	Rhod. Katanga	20 1/2	-1	Turner & Newall	52/3	+3d
E. Rand Props	4 1/2	-1/2				Rhod. Katanga	20 1/2	-1	Wankie	14/-	+3d
Geduld	13/-	-9d	<b>AUSTRALIAN GOLD</b>			Rhod. Katanga	20 1/2	-1	Witbank Colliery	3 1/2	+ 1/2
Govt. Areas	24/-	-6d	Boulder Perseverance	2/3	+1 1/2	Rhod. Katanga	20 1/2	-1			
Grootvlei	12/6	-6d	Gold Mines of Kalgoutie	10/-	-7 1/2	Rhod. Katanga	20 1/2	-1			
Libanon	28/-	-6d	Great Boulder Prop.	7/4	+1 1/2	Rhod. Katanga	20 1/2	-1			
Lupatards Vlei	22/-	-6d	Lake View and Star	14/9	-3d	Rhod. Katanga	20 1/2	-1			
Marievale	24/4	-1/2	Mount Morgan	11/9	-1 1/2	Rhod. Katanga	20 1/2	-1			
Modderfontein East	24/4	-1/2	North Kalguri	6/6	-3d	Rhod. Katanga	20 1/2	-1			
New Kleinfontein	46/9	-1/3	Sons of Gwalia	7/6	-6d	Rhod. Katanga	20 1/2	-1			
New Pioneer	10/-	-1/3	South Kalguri	12/-	-1 1/2	Rhod. Katanga	20 1/2	-1			
Randfontein	13/9	-1/3	Western Mining	9/6	-1 1/2	Rhod. Katanga	20 1/2	-1			
Robinson Deep	5/6	-1/3				Rhod. Katanga	20 1/2	-1			
Rose Deep	27/6	-1/3				Rhod. Katanga	20 1/2	-1			
Simmer & Jack	29/3	-1/3				Rhod. Katanga	20 1/2	-1			
S.A. Lands	2 1/2	-1/3				Rhod. Katanga	20 1/2	-1			
Spring	8/9	-1/3				Rhod. Katanga	20 1/2	-1			
Stifffontein	15/6	-1/3				Rhod. Katanga	20 1/2	-1			
Sub Nigel	15/6	-1/3				Rhod. Katanga	20 1/2	-1			
Van Dyk	35/3	-1/3				Rhod. Katanga	20 1/2	-1			
Venterspost	58 1/2	-1/3				Rhod. Katanga	20 1/2	-1			
Vlakfontein	50/-	-1/3				Rhod. Katanga	20 1/2	-1			
Vogelstruisbult						Rhod. Katanga	20 1/2	-1			
West Driefontein						Rhod. Katanga	20 1/2	-1			
West Rand Consolidated						Rhod. Katanga	20 1/2	-1			
Western Reef						Rhod. Katanga	20 1/2	-1			

## COMPANY NEWS AND VIEWS

### Rietfontein's Satisfactory Developments

Although one of the minor companies of the Gold Fields group, Rietfontein Consolidated has made a very satisfactory showing since it started up in 1935. Tonnage, output and profits have been small in comparison with other mines of the Rand but dividends have been regularly paid. The property is underlain by the Main, South and North reefs, all of which are being worked and the development footage last year amounted to 19,121 (against 19,690 ft.). The total sampled was 9,220 giving a pay ratio of 41.5 per cent which was slightly below that of the previous year, as likewise the value 7.4 dwt. Operations were hampered, as with so many other mines, by shortage of native labour, particularly during the latter half of the year. Exploratory work in the upper levels and in the Eastern section of the mine has continued to give satisfactory results and is proceeding in order to retrieve as much tonnage as possible.

There was not much difference in milling last year—325,000 tons were put through as against 326,500, yield being very similar, 4.43 dwt. Revenue was down at 56s. 9d. (58s. 1d.), while working costs rose by 2s. 4d. to 35s. 1d. and profit per ton dropped to 21s. 7d. (25s. 5d.). Total working profit decreased to £351,891 as against £414,992. A smaller amount was called for in taxation—£176,708 (£215,904) and after making the necessary appropriations and allowing for sundry income, the net profit amounted to £171,771 compared with £194,161. This drop necessitated the dividend being lowered from 3s. to 2s. 7½d. per share. Balance carried forward was £17,718 as against £11,444 brought in. The average price received for the 72,087 oz. of gold produced (72,665) was 249s.

### Robinson Deep's Higher Net Profit

Although operations on the Robinson Deep during 1952 were hampered by shortage of native labour and restricted electrical power, it was able to overcome them fairly well. Working profit was £41,953 lower at £219,802 but the company made a profit of £43,079 on sale of a township which enabled the net profit for the year to come out at a slightly higher figure than previously; it amounted to £277,120 against £265,648.

Tonnage milled was lower by 19,000 tons at 1,331,000 but the up-grading of the ore (3.36 against 3.16 dwt.) resulted in a bigger yield of gold—224,236, compared with 213,337 oz. Revenue was 1s. 9d. per ton better at 43s. 1d. but the effect of this was lost with the 2s. 5d. per ton rise in working costs at 39s. 10d. Profit per ton dropped from 3s. 10d. to 3s. 3d. and the total working profit from £261,755 to £219,802. Taxation called for £48,997 (£34,637) and general reserve £84,339 (£58,317). The dividend was reduced to 1s. 3d. compared with 2s. the previous year, absorbing £125,000 and the balance forward was £33,375 as against £14,591 brought in.

Development footage was slightly reduced at 26,638, as also footage sampled of 11,795 ft., but pay ratio of 51 per cent was better (48.7 per cent) as likewise value, 7 dwt. (6.1 dwt.). The higher grade of the ore developed and the elimination of further tonnages of lower grade ore as a result of increase in working costs, is reflected in lower tonnage and higher average value of reserves. These amount to 1,756,000 compared with 2,010,000 tons of 4.3 compared with 4.1 dwt.

### Underground Work of Simmer & Jack

Some important features characterize the results of Simmer and Jack Mines for the year 1952. They relate principally to developments which were again satisfactory due principally to encouraging exposures by exploratory work in the old upper areas. They have given gratifying results and contributed largely to the tonnage milled. Simultaneously, work has progressed in connection with the west sub-vertical shaft which was sunk to its final depth of 2,362 ft. in 1951. Operations last year were directed to the layout and lateral development commenced on 59, 60 and 61 levels; work was also undertaken on three levels below.

Total footage of development was 47,908 ft. against 45,650 ft., and of the 24,065 ft. sampled, 41.6 (against 38.8) per cent proved payable, with a much better value, 6.7 compared with 5.4 dwt. The pay limit of ore reserves has been up-graded from 3.8 to 3.9 dwt., and the tonnage shows a decrease of 576,000 at 2,163,000 tons.

The programme of diamond drilling from the surface to test the potentialities of the Kimberley Reef horizon have disclosed no values of economic interest. A similar programme is now being carried out to test the Bird Reef horizon.

Milling was kept down by restricted labour and power. Tonnage crushed showed a decrease of 22,000 at 1,486,000 tons. Yield was slightly better, 3.19 (3.18 dwt.), but revenue was 7d. per ton lower at 40s. 11d. and this with a rise of 2s. 5d. in costs, almost halved the profit per ton (3s. 7d. against 6s. 8d.). Total working profit was £271,261 against £507,053. Taxation was light—£5,379 against £81,441. General reserve received £65,537 (£241,962). Net profit was £285,058 compared with £500,338 and the dividend of 7d. per share against 8d., absorbed £196,875. The balance forward was £29,438 compared with £21,446 brought in.

### Vlakfontein's South-Western Section

Work in connection with the opening up of the south-western section of the Vlakfontein mine, adjoining West Vlakfontein's boundary, has been going forward. It was continued during 1952 and while results were considered satisfactory, the average value of the ore developed was lower when compared with the previous year. The opening up of this section of the mine is reflected in results and in the value of ore reserves.

A slightly higher tonnage—447,000 against 444,000—was put through the mill last year but the grade was lower, 7.38 against 7.45 dwt., and revenue per ton dropped to 94s. 6d. (97s. 3d.). This, with the moderate rise of 8d. per ton in costs to 50s., resulted in the profit per ton dropping by 3s. 4d. to 44s. 6d. The total working profit did not suffer severely being £67,700 down at £995,765. Taxation called for more—£410,772 against £300,662, and after transferring £195,449 (£275,104) to general reserve, the dividend was decreased from 1s. 8d. to 1s. 4d., absorbing £400,000. The forward balance of £7,760 went against £8,617 brought in.

The footage of development amounted to 42,028 as against 44,885 and of the 32,430 ft. sampled, 29.1 per cent proved payable, averaging 7.9 dwt. Payability the previous year was slightly higher, 29.9 per cent, and value 8.8 dwt. Ore reserves were again built up and now amount to 1,347,000 tons of 8.6 dwt.

### Bright Showing by Vogelstruisbult

The satisfactory milling returns of Vogelstruisbult Gold Mining for 1952 were quite as expected; an expansion of operations came about towards the end of last year due to the addition of the fourth unit of the plant. This has brought the capacity of the reduction works up to 100,000 tons monthly.

Tonnage milled last year was 990,500 against 929,000 tons. Recovery was better—257,682 oz. (234,399 oz.) and the yield of 5.203 dwt. compared with 5.046 dwt.; revenue was 66s. 9d. as against 66s. 1d., and had it not been for the up-trend in costs, the total profit would have been substantially better. However, costs rose by 2s. 8d. per ton to 44s. 7d., and the result was a drop in profit per ton of 2s., or a total amount lower by £26,403 at £1,098,966. After taking into account sundry income and making provision for expenditures, there was a net amount of £1,077,789. Taxation was slightly lower at £417,047, a sum of £157,884 was transferred to general reserve and the remaining amount of £502,858 was sufficient to meet the maintained dividend of 2s. per share. As in the previous year, there was no balance. At the end of the year current liabilities and provisions exceeded cash assets by £238,040.

Development and ore reserves show up well and the technical position of the mine looks eminently satisfactory. Footage advanced last year was 51,804 ft. compared with 50,494 ft., and of the 34,495 ft. sampled, 50.8 per cent (against 48.4) proved payable with a slightly better average value of 6.4 dwt. and stoping width. The tonnage mined was larger and the computation of ore reserves indicated an increase of 48,000 tons at 3,173,000 tons of 5.5 dwt. During the year the drive advanced by Vlakfontein connected with the heading advanced by "Vogels." It is being used as a waterway and will later afford ventilation facilities. The uranium plant is expected to be ready for operation about the middle of next year.

## Company Shorts

**Exploration Company's Exceptional Dividend Income.**—The Exploration Company, during 1952, made a trading profit of £16,867, against £27,702 for 1951. Gross dividend income during the year expanded sharply to £51,428 against £9,104 in the previous year, but the directors state that this was exceptional and was closely related to the losses less profits on dealing of £32,105 and the income tax recoverable of £25,121. At the end of 1952 the debit balance carried forward was £21,379, compared with a debit of £28,203 brought in.

The balance sheet presented a more encouraging picture. Net assets increased from £129,574 to £136,398. Quoted investments at their market value totalled £107,104 and unquoted investments, at directors valuation, amounted to £12,168. The company's investment portfolio is well spread in gold, base metals and industrials. Mr. M. Woodbine Parish is chairman and managing director. Meeting, London, May 4.

**The Liruien Kano District of Northern Nigeria.** Without even the benefit of printers' error to comfort us, the Liruien Kano district of Northern Nigeria was, in our last issue, for the second time in the space of less than nine weeks, described in these columns as being in Northern Rhodesia. Errors have a nasty way of perpetuating themselves and thus for the second time we hasten to state the Liruien Kano district is, no matter how viewed, definitely situated in Northern Nigeria.

The Liruien Kano district of Northern Nigeria has been much in the news of late as it is the area in which Gold & Base Metal Mines of Nigeria are currently working columbite deposits as part of a scheme to raise its columbite output in the current year to over 80 tons, which compares with an output of 26 tons of columbite in 1952.

### American Metal Appointments

Mr. Rowland H. George has been elected a director of the American Metal Company to fill the vacancy created by the death of Mr. Norman Hickman. In addition, the following executives of the company have been elected vice-presidents: Mr. Thomas W. Childs, Mr. Herbert S. Cohen, Mr. Hugo de Neufville, Mr. Ernest T. Rose, Mr. Hans A. Vogelstein and Mr. Jean Vuillequez.

## AMALGAMATED BANKET AREAS

The 17th annual general meeting of Amalgamated Banket Areas Ltd., was held on April 29 in London, Major General W. W. Richards, C.B., C.B.E., M.C., chairman, presiding.

The following is an extract from his statement:

The net profit for the year ended September 30, 1952, £139,819, added to the balance of £202,867 brought in from the previous year, gives a total to the credit of profit and loss account, before appropriations, of £342,686. A dividend of 5 per cent, less income tax, is recommended, absorbing £75,729 and leaving a balance of £196,559 to the credit of profit and loss account.

There are several features of good developments on the five main sections; the most important being:

(1) Abbontiakoon, where, in the deepest level of the mine, the 20th Level reef was proved on "C" East Limb Drive North for 620 ft. averaging 5.7 dwt. per ton over a width of 39.5 in. Since the end of the year, good values have been intersected 150 ft. above the level and also in the downward extension of the West and Main Reefs in the footwall of the Drive.

(2) Taquah-Mantraim. In the Taquah Southern Mines Section, the 14th Level Drive North proved 155 ft. averaging 5.96 dwt. per ton over a width of 36.7 in.

In the Mantraim Section, development results have been consistently good and indicate a considerable additional tonnage of good grade ore to the reserves. (23,000 tons of 7.5 dwt. ore were added to reserves during the year under review.)

(3) Tamsuo-Effuenta. In Effuenta 7th Level, driving on "B" reef North has proved a total length to date of 315 ft. averaging 6.78 dwt. per ton over 36.3 in.

(4) Fanti. The best development in this section was at the South end of the 14th Level South Drive, where an oreshoot was proved for a length of 480 ft. averaging 5.3 dwt. over 40.5 in.

The total ore reserves are computed at 3,979,173 tons.

The technical reports and data accompanying the annual report give a fair picture of the magnitude and importance of the company's operations.

We are pleased to pay tribute to the general manager, Mr. A. N. Napier, A.H.W.C., M.A.I.M.E., A.M.I.M.M., for his excellent work, and to the staff, both European and African, for their loyal support. Once more we have been well served by our consulting engineers, the West African Gold Corporation.

The report and accounts were adopted.



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## THE INTERNATIONAL NICKEL COMPANY OF CANADA

### ANOTHER OUTSTANDING YEAR

The Annual Meeting of The International Nickel Company of Canada Ltd., was held on April 29 at Toronto.

Dr. John F. Thompson, the Chairman, in the course of his address said:—

Nineteen fifty-two was another outstanding year in the Company's history. For the third successive year we maintained production at capacity and supplied more than 75 per cent of the nickel used by the free world. In the last three years, in response to an unprecedented demand, the Company delivered a total of nearly 100,000,000 lb. more nickel than the amount which we delivered over any prior three-year period, exclusive of World War II. Our 1952 deliveries of nickel in all forms totalled 249,000,000 lb., an increase of more than 5,000,000 lb. over 1951.

The net earnings for the year were \$58,891,000, or \$3.90 a share on the common stock, which were exceeded only by those of \$62,875,000, or \$4.17 a common share, in 1951. The reduction in 1952 earnings was the result of increased production costs and of the reduced value of the United States dollar relative to the Canadian dollar.

### FINANCIAL

During the year the same influences which adversely affected our costs in the post-war period continued to prevail. Wages were again increased in general conformity with the wage pattern in the three countries in which we operate plants. The costs of supplies and services, such as freight and electric power, also rose. In addition, the weakening of the United States dollar in relation to the Canadian dollar had an unfavourable effect on the Company's earnings. Much of the greater part of our operating costs is incurred in Canadian dollars while the major portion of our sales is made basically in United States dollars or the equivalent thereof in sterling or other currencies.

Throughout the year the price of nickel remained unchanged at the level prevailing during the latter half of 1951. On January 14, 1953, however, and pursuant to earlier discussions with the governmental authorities at Ottawa, the price was raised 3½ c. (United States) per lb. This brought our United States price for electrolytic nickel to 60 c. per lb., including the 14 c. United States import duty. Substantially equivalent prices were made effective simultaneously for our Canadian, United Kingdom and other markets.

The Company has consistently endeavoured to maintain a strong cash position. In the light of the world-wide inflation which has characterized the post-war period, this policy has proven to be well justified. With the continued rise in costs, including wages, more cash is required to carry on our operations and to defray the expense of our capital expenditure programme. It is certain that our cash resources must be sufficient to meet not only our operating and capital expenditure programmes but also to cover future contingencies.

During 1952 four quarterly dividends of 50 c. per share were paid on the common shares, with an extra dividend of 60 c. in December. The total of \$37,903,000, or \$2.60 a share, was the same as the previous annual high mark established in 1951. In each of the four preceding years dividends of \$2.00 per share were paid. Four regular quarterly dividends of \$1.75 per \$100 of par value were paid on the preferred shares.

### PRODUCTS

Distribution of nickel throughout the year was made internationally in accordance with allocations recommended by joint action of the Canadian and other member Governments of the International Materials Conference. Approximately 68 per cent of the free world's supply was allocated to the United States and over 18 per cent to the United Kingdom, Canada and other Commonwealth countries.

The production of military aircraft in the United States, the United Kingdom and Canada in 1952 consumed large amounts of nickel-containing alloys, including engineering alloy steels, stainless steels and complex heat-resistant, or "super," alloys.

A large quantity of the primary nickel for aircraft alloys in the United States is consumed by the steel industry, which uses it in the manufacture of special jet engine alloys, as well as in stainless steels and low alloy steels.

High nickel alloys of the Nimonic and Inconel types produced in our plants in the United Kingdom and the United States have been required in such large volume as to necessitate expansion in production facilities.

Deliveries of refined copper in 1952 of 234,300,000 lb. closely approximated those of 236,900,000 lb. in the previous year. Our Canadian consumers, as in 1951, received 55 per cent of the total. The remainder continued to be marketed in the United Kingdom, the United States and Continental Europe.

Following the release of copper from price control in the United States in February of this year, the Canadian Govern-

ment discontinued its official policy with respect to the price of copper for consumption in Canada. Thereupon, our Company increased its price to domestic consumers in Canada from the previously existing 29½ c. (Canadian) per lb. to 33½ c. (United States). This brought our domestic price into conformity with the price at which the United Kingdom Ministry of Materials had been buying copper from Commonwealth producers.

Concern has been expressed that the market will be unable, in the face of increased competition from aluminium, stainless steels and similar materials, to absorb the expected enlargement of world copper production. My experience with this type of competition is that in the long run good development and sales efforts on any one commodity tend to expand the markets for all. The developing of markets for copper in the coming years will be helped greatly by the high cost of construction, maintenance and repair, and the consequent economy resulting from the use of more permanent materials.

Our production of platinum and palladium, the two principal platinum group metals, as well as of rhodium, ruthenium and iridium, continued at a high level.

Deliveries of all these metals combined totalled 287,000 oz. in 1952, compared with 375,000 oz. in 1951, and 267,000 oz. in 1950.

The Company's output of gold was sold abroad, in accordance with Canadian Government regulations permitting export sales of gold free of governmental price controls. Deliveries of gold were 42,300 oz., as compared to 38,000 oz. in 1951.

Silver deliveries were 1,076,000 oz., against 1,027,000 oz. in the previous year. Our silver was sold at prevailing market prices and very largely in Canada.

The recovery of cobalt concentrate has been substantially increased as a result of process improvements at our Port Colborne, Ontario, refinery. This concentrate, which is not of major importance in relation to the total world supply, is refined as salts and oxides at our Clydach, Wales, refinery.

With the continuation of peak demand for nickel, our smelters at Copper Cliff and Coniston, Ontario, and our refineries at Copper Cliff and Port Colborne, Ontario, and Clydach, Wales, operated continuously throughout the year so as to maintain the Company's production at full capacity.

Two important process developments at Copper Cliff—the recovery of nickel and iron ore from nickeliferous pyrrhotite and the oxygen flash smelting of copper concentrates—were referred to in the Annual Report. The oxygen flash smelting project has already reached the point where by-product liquid sulphur dioxide is being delivered to the Canadian trade. The pyrrhotite process has been carefully tested by pilot plant procedures and we are now taking steps necessary for designing a first production unit.

As a result of major alterations completed during the year, the operating efficiency of our nickel refinery at Clydach has been greatly improved.

### DEVELOPMENT AND RESEARCH

Development and research efforts continued to be directed largely toward the problems encountered in rearmament and in the adjustments required by civilian producers faced with the necessity of using emergency alternates in place of the materials with which they have been familiar. It is interesting to note that, even in these times of prolonged restrictions on the use of metals, it has proved impracticable to satisfy many of the requirements of industry in terms of other alloys containing less nickel. Appreciable knowledge of the usefulness of nickel has been gained which, coupled with the fruits of long-term research projects, will be of great assistance in promoting future markets when conservation measures are no longer in effect.

Nickel would not enjoy its high standing as an alloying element had we not deliberately set out to bridge the gap between pure science and industrial practices. What is learned in development and research laboratories and also in the field is assembled and made known to both scientists and industrialists through our technical service sections located in various key industrial areas in the United States and Canada, and technical information centres located in the United Kingdom, Belgium, France, Italy, Germany and five other countries. The oldest of these information centres, Centre d'Information du Nickel, of Paris, France, celebrated its twenty-fifth anniversary during the year.

### OUTLOOK

I think it has been apparent for many years that our basic belief has been that nickel is one of the fundamental metals of the modern world and that the number of places in which it can be used is limited only by our imagination and our will to seek them out. We still are animated by the conviction that there are many uses for nickel as yet undiscovered and that by determination and persistent effort these new uses will be found and developed profitably. In conclusion your Company is in a strong position, both in material resources and in skilled and experienced personnel, to successfully continue this task.

The reports and accounts were adopted.

# ANGLO-TRANSSVAAL CONSOLIDATED INVESTMENT CO. LIMITED

Mining Companies' Directors' Reports for Quarter Ended 31st March, 1953

Following are the reports on work done during the quarter ended 31st March, 1953

## ANGLO-TRANSSVAAL COLLIERIES, LIMITED

The Sales Output of the Subsidiary Collieries controlled by this Company for the quarter ended 31st March, 1953, totalled 259,458 tons.

### EASTERN TRANSSVAAL CONSOLIDATED MINES, LIMITED

The total tonnage treated during the quarter ended 31st March, 1953, by the four gold mines operated by this Company amounted to 54,860 tons, resulting in a Working Profit (including Sundry Revenue) of £50,381 for the quarter.

Revenue from the sales of gold at higher than standard prices, sold for manufacturing purposes during the three months January to March, 1953, inclusive, amounted to £4,054, making a Total Profit for the quarter of £54,435.

The Profit, as shown above, does not take into consideration the amount, estimated at £20,500 for the quarter, payable to the Government in Mining Taxation.

Capital Expenditure during the quarter amounted to £19,840.

**PROPERTY**—During the quarter, the "Golden Quarry" Mine, comprising 244 Claims, and situated adjacent to the Sheba Mine, was purchased by the Company. That mine now constitutes the "Edwin Bray" and "Margaret" Sections of the Sheba Mine.

Mining operations commenced during February, 1953. An adit on the elevation of the 6th Level is being advanced for the exploration of the area at that depth and also to facilitate the extraction of ore from the upper levels.

By reason of the increase in ore available on the upper levels, with the acquisition of the "Golden Quarry" Mine, it has been decided to defer the deepening of the Zwartkopje Vertical Shaft.

**GENERAL**—A total of 334 feet of development from the Ben Lomond Tunnel was accomplished during the quarter, bringing the advance in connection with this work to a total of 5,231 feet.

Good progress was made with work in connection with the extension of the new Consort Power Station. The 3,000 K.W. steam turbine and condenser were placed in position. The boiler foundation was completed, the framework for the boiler erected and the smoke-stack installed.

### HARTEBEESTFONTEIN GOLD MINING COMPANY, LIMITED

#### SHAFT SINKING

Excavations for 2 vertical circular shafts, having a shaft diameter of 21 feet inside lining, were commenced during the quarter.

**No. 1 SHAFT** was commenced on 1st January, 1953, and reached a depth of 100 feet at the end of the quarter. At this depth, sinking was stopped temporarily to permit of the erection of the circular concrete headgear.

The shaft collar was installed and the shaft was concrete lined to a depth of 100 feet.

**No. 2 SHAFT**, which was commenced on 23rd February, 1953, reached a depth of 25 feet at the end of the quarter and was concrete lined to a depth of 12 feet.

#### SHAFT SINKING EQUIPMENT

**No. 1 SHAFT**—The concrete mixing plant was installed.

The foundations for the Stage Hoist and the North 1150 H.P. permanent Electric Winder were completed and work on the foundations for the South 1150 H.P. permanent Electric Winder was commenced.

The building to house the Stage Hoist and the foundations for the North and South Hoist buildings were completed. The erection of the Stage Hoist is nearing completion.

Work has been commenced on the circular reinforced concrete headgear.

**No. 2 SHAFT**—A concrete mixing plant has been installed and a second unit is under construction.

#### DIAMOND DRILLING

**BOREHOLE HB.21**, situated approximately midway between Boreholes **HB.5** and **HB.18**, was completed during January, 1953. This borehole was drilled to obtain further information for the siting of **No. 2 Shaft**.

The following results of Vaal Reef intersections have been published:—

Depth (Ft.)	Value (dwt.)	Corrected Width (In.)	In.-dwt.	Remarks
6,159	6.16	24.9	153	Original Intersection. Core recovery complete.
6,155	5.69	27.8	158	1st Deflection. Core recovery complete.
6,156	3.59	25.9	93	2nd Deflection. Core recovery complete.
6,155	9.00	26.0	234	3rd Deflection. Core recovery nearly complete.

**BOREHOLE HB.22**, situated approximately 2,600 feet north of Borehole **HB.6** on the line between Boreholes **HB.6** and **HB.10**, is being drilled to obtain structural information to assist in the layout of development from **No. 1 Shaft**. At the end of the quarter this borehole reached a depth of 2,649 feet in Witwatersrand Sediments and, since the end of the quarter, Vaal Reef was intersected at a borehole depth of 2,676 feet assaying 51.8 dwt. over a corrected width of 5.15 inches, equivalent to 267 in.-dwt.

**EUROPEAN HOUSING**—Work is proceeding on the erection in the Stilfontein Township of 78 houses and a single quarters block of 40 rooms, together with a Mess. The present programme provides for the building of 103 houses.

To augment the above and to provide accommodation for personnel engaged in initial construction, the Company has purchased 10 houses and 2 blocks of flats, containing altogether 28 flats, in Klerksdorp.

**NATIVE COMPOUNDS**—Native employees are housed in temporary quarters.

The foundations for 5 blocks of rooms of the permanent Compound are being constructed.

**POWER SUPPLY**—A small power allocation, sufficient for present requirements, is being obtained from the Electricity Supply Commission's substation at Stilfontein.

A 3,000 K.W. Steam Turbine generating plant has been purchased by the Company and work is proceeding in connection with its installation. At the end of the quarter, the work completed consisted of foundations for the boilers, turbine and generator; the substation at **No. 1 Shaft** with equipment and the foundations for the substation at **No. 2 Shaft**. A railway siding for the delivery of coal and stores has been planned.

**COMPRESSED AIR SUPPLY**—Compressed air supplies are at present being obtained from a portable diesel-engined compressor at **No. 1 Shaft**, and from two small compressors driven by electric motors at **No. 2 Shaft**.

The site of the permanent compressor station has been selected and work is proceeding on the laying of a 10 inch air column to **No. 1** and **No. 2 Shafts**. At the end of the quarter, 2,300 feet of piping had been laid.

**WATER SUPPLY**—A supply of water, adequate for present requirements, is being obtained from 5 boreholes sunk on the property. Water reticulation to both shafts and to all buildings has been completed and is being extended to the Power Station.

**MINE BUILDINGS**—Temporary offices, mine stores and workshops were erected in December, 1952, and extensions to these were made during the quarter.

Excavations for the foundations of the permanent Workshops and Stores buildings have been completed.

Temporary magazines have been constructed and licensed for use.

Cementation Sheds and Shaft Offices have been erected at **No. 1** and **No. 2 Shafts**.

**LABOUR**—The labour strength at the end of the quarter was:—Europeans, 54; Natives, 280.

**CAPITAL EXPENDITURE**—Capital Expenditure amounting to **£206,162** was incurred during the quarter on shaft sinking, buildings and plant.

The total Capital Expenditure, including preliminary expenses, incurred to 31st March, 1953, amounted to **£725,414**.

**MINING LEASE**—The Company has received a letter from the Secretary for Mines advising that the Honourable the Minister of Mines, in respect of the areas forming the subject of the Company's mining lease application (i.e. portions of the farms Hartebeestfontein No. 41 and Zandpan No. 43, District Klerksdorp, in extent equivalent to 4,889 claims approximately), has agreed:—

1. To grant a mining lease over the areas on which the Company owns the mineral rights in extent **4,020** claims.
2. To the cession in favour of the Company, by Stilfontein Gold Mining Company, Limited, of **300** claims presently forming part of that Company's lease area, for inclusion in this Company's lease area.
3. To recommend to His Excellency the Governor General the grant of a mining lease over the Crown Land areas concerned, in extent **569** claims.

The consideration payable to the State will be a share in the annual profits determined according to the formula  $Y = 17.5 \frac{105}{x}$  and is in addition to any taxation in force by statute on the profits of mining.

### MERRIESPRUIT (ORANGE FREE STATE) GOLD MINING COMPANY, LIMITED

#### SHAFT SINKING

**No. 1 SHAFT** was sunk **138** feet in quartzites of the Upper Witwatersrand System to a total depth of **3,771** feet.

The shaft was concrete lined to a depth of **3,768** feet, of which **143** feet were accomplished during the quarter. The intersection in pilot holes of water-bearing fissures, requiring cementation, considerably delayed sinking operations, particularly during the months of February and March, when sinking was suspended. In the meantime it has been decided that development on reef will be carried out on the horizons which are now accessible from the shaft stations.

**SHAFT EQUIPMENT AT No. 1 SHAFT**—Work is proceeding on the erection of the 4,400 H.P. Permanent Electric Winder.

**DIAMOND DRILLING**—Borehole KA.2, situated approximately 4,000 feet south of No. 1 Shaft, was commenced during the quarter for the purpose of obtaining structural information to assist in the development layout. The depth reached at the end of the quarter was **2,365** feet. Karroo system was encountered down to a depth of **1,365** feet and the remainder of the drilling was in Ventersdorp Sediments.

**POWER SUPPLY**—The construction, by the Electricity Supply Commission, of an overhead power line from Virginia to Merriespruit has been completed.

**LABOUR**—The labour strength at the end of the quarter was:—Europeans: **46**; Natives: **427**.

#### CAPITAL EXPENDITURE

Capital Expenditure amounting to **£141,760** was incurred during the quarter on shaft sinking, buildings and plant.

The total Capital Expenditure, including preliminary expenses, incurred to 31st March, 1953, amounted to **£2,463,527**.

### MIDDLE WITWATERSRAND (WESTERN AREAS), LIMITED

The Company retains its interests in Mineral Rights in the Virginia and Odendaalsrus Districts of the Orange Free State and in the Klerksdorp District of the Transvaal. During the quarter the Company exercised its option to purchase the Mineral Rights of the farm Britzpan No. 1289, in the Odendaalsrus District.

#### DRILLING OPERATIONS

During the quarter a total of **7,840** feet was drilled in **3** boreholes.

Borehole No.	Drilled on joint account with	Farm	Depth at 31st March, 1953 Ft.	Formations traversed during Quarter		Reefs intersected					Remarks
				Borehole Depth (ft.) From To	Description	Reef	Depth ft.	Value dwt.	Corrected width in.	In.-dwt.	
VDH. 6/51	General Exploration Orange Free State, Limited	Vanden Heeverstru No. 419 District Odendaalsrus	6,466 Original borehole completed on 18th February, 1952 Deflections completed on 16th February, 1953			"A" Reef Upper	5,499 5,555	6.92 Negligible	28.4	196	1st deflection 1st deflection. Now correlated with horizon intersected at depth of 5,580 feet in original borehole
						"A" Reef Upper	5,507 5,538	11.00 1.06	11.6 113	128	2nd deflection 2nd deflection Borehole width 2nd deflection Borehole width
						—	5,555	0.39	312		
TL. 37/52		Klerksdorp Townlands No. 44, District Klerksdorp	4,660 In progress	456	4,660	Ventersdorp Lava					
TL. 40/52		Klerksdorp Townlands No. 44, District Klerksdorp	4,769 In progress	2,011	4,769	Ventersdorp Lava					

In addition, the Company is participating in the drilling of the following boreholes in the Orange Free State:—

Borehole Number	Farm	Drilled by
ERK.1	Energie No. 896, District Odendaalsrus	Free State Development and Investment Corporation, Limited
BH.2 (RD.2)	Rosedale No. 898, District Odendaalsrus	General Exploration, Orange Free State, Limited
BH.3 (SB.3)	Spes Bona No. 921, District Odendaalsrus	General Exploration, Orange Free State, Limited
GS.1	Gelukspan No. 394, District Ventersburg	New Consolidated, Free State, Exploration Company, Limited

### NEW KLERKSDORP GOLD ESTATES, LIMITED

#### PRODUCTION

Tons milled — <b>30,880</b> yielding <b>4,125.93</b> ounces fine of gold									
Revenue from Gold .. .. .	..	..	..	..	..	..	..	..	<b>£51,021</b>
Working Costs .. .. .	..	..	..	..	..	..	..	..	<b>£48,327</b>
									<b>£ 2,694</b>
Sundry Revenue .. .. .	..	..	..	..	..	..	..	..	<b>£ 713</b>
Working Profit for the Quarter .. .. .	..	..	..	..	..	..	..	..	<b>£ 3,407</b>
Working Costs per ton milled .. .. .	..	..	..	..	..	..	..	..	<b>31s. 4d.</b>
Working Costs per fine ounce recovered .. .. .	..	..	..	..	..	..	..	..	<b>234s. 3d.</b>

In addition to the above revenue, **£1,371** accrued in respect of increased revenue from the sales of gold at higher than standard prices, sold for manufacturing purposes during the quarter.

The Company was declared a controlled, registered mine as from 1st January, 1953, and Working Costs include a provision towards the estimated current Silicosis contributions for the financial year. In addition, a Retrospective Liability, which has not yet been assessed by the Silicosis Board, will be payable by annual instalments and will necessitate a further charge against profits until the total liability under this heading is discharged.

The working profit for the quarter, as shown above, does not take into consideration interest on loan amounting to £1,478 for the quarter.

No liability was incurred for mining taxation payable to the Government in respect of the profits earned for the quarter.

**DEVELOPMENT**—The total footage advanced during the quarter amounted to 1,736 feet. Of 685 feet sampled, 115 feet, equal to 16.8 per cent, were classed as payable at an average value of 3.36 dwt. per ton over a channel width of 39 inches, equivalent to 131 in.-dwt. (The above results are based on actual sampling. No allowance has been made for adjustments necessary in the valuation of the corresponding Ore Reserve.)

**PROSPECTING**—A prospecting programme in the Northern portion of the mine was commenced, consisting of the drilling of shallow boreholes. The following are the sampling results of reefs intersected:—

Borehole Number	Reefs Intersected	Depth (ft.)	Value (dwt. per ton)	Corrected width (in.)	In.-dwt.
TL.41	Uncorrelated Reef .. ..	426	2.8	10.4	29
	Reef in Commonage Zone .. ..	520	1.2	4.6	6
	Do. .. ..	524	1.0	3.7	4
	Reef in Ada May Zone .. ..	585	2.6	16.7	44
	Do. .. ..	588	4.2	5.6	24
TL.42	Uncorrelated Reef .. ..	328	1.0	11.5	12
	Reef in Ada May Zone .. ..	622	3.57	13.4	48
	Do. .. ..	633	7.20	5.7	41
	Do. .. ..	635	3.60	5.7	21
	Do. .. ..				

A further borehole, TL.43, had reached a depth of 165 feet in sediments of the Upper Witwatersrand System.

### RAND LEASES (VOGELSTRUISFONTEIN) GOLD MINING COMPANY, LIMITED

#### PRODUCTION

Tons crushed : 480,000 yielding 83,134 ounces fine of gold	Per ton crushed
Revenue from Gold .. ..	£1,028,388 42s. 10d.
Working Costs .. ..	£949,809 39s. 7d. (228s. 6d. per ounce fine)
	78,579 3s. 3d.
Sundry Revenue .. ..	£13,500 7d.
Working Profit for Quarter .. ..	£92,079 3s. 10d.

Working Costs per ton, 39s. 7d., include 5s. 1d. in respect of development expenditure.

In addition to the above revenue, £28,583 accrued in respect of increased revenue from the sales of gold at higher than standard prices, sold for manufacturing purposes during the quarter.

The Working Profit for the quarter, as shown above, does not take into consideration the amount, estimated at £12,000 for the quarter, payable to the Government in Taxation and as its share of the profits in terms of the Mining Lease.

**CAPITAL EXPENDITURE**—The expenditure on Capital Account during the quarter amounted to £35,449.

**DEVELOPMENT**—A total of 16,659 feet of shaft sinking and development was accomplished during the quarter, of which 7,520 feet were sampled, showing 4,080 feet, equal to 54 per cent, as payable. Payable reef disclosures were distributed as follows:—

Reef	Footage Sampled	Payable				
		Ft.	Percentage	Channel Width (in.)	Channel Value (dwt.-ton)	In.-dwt.
Main Reef .. ..	2,330	1,040	45	34.4	6.84	235
Main Reef Leader .. ..	2,640	1,440	54	11.4	23.56	269
South Reef .. ..	1,310	830	63	10.4	23.35	243
Total Main Reef Series .. ..	6,280	3,310	53	18.4	13.71	252
Kimberley Reef .. ..	1,240	770	62	58.3	5.16	301
Totals and Averages .. ..	7,520	4,080	54	25.9	10.08	261

(The above results are based on actual sampling. No allowance has been made for adjustments necessary in the valuation of the corresponding Ore Reserve.)

### VILLAGE MAIN REEF GOLD MINING COMPANY (1934) LIMITED

#### PRODUCTION

Tons treated : 101,000 yielding 15,820 ounces fine of gold	Per ton treated
Revenue from Gold .. ..	£195,819 38s. 9d.
Working Costs .. ..	£155,443 30s. 9d. (196s. 6d. per ounce fine)
Working profit for quarter .. ..	£40,376 8s. d.

Working costs per ton, 30s. 9d., include 6s. 1d. in respect of development expenditure.

The Company was declared a controlled, registered mine as from 1st January, 1953, and Working Costs include a provision towards the estimated current Silicosis contributions for the financial year. In addition, a Retrospective Liability, which has not yet been assessed by the Silicosis Board, will be payable by annual instalments and will necessitate a further charge against profits until the total liability under this heading is discharged.

In addition to the above revenue, £3,781 accrued in respect of increased revenue from the sales of gold at higher than standard prices, sold for manufacturing purposes during the quarter.

The working profit for the quarter, as shown above, does not take into consideration interest on loan amounting to £296 for the quarter, nor the further amount, payable to the Government in mining taxation, estimated at £17,000 for the quarter.

**CAPITAL EXPENDITURE**—The expenditure on capital account during the quarter amounted to £2,298.

**DEVELOPMENT**—8,086 feet of development were advanced during the quarter, and 4,515 feet of old drives and crosscuts were reconditioned. In addition, 1,389 feet of underground diamond drilling were done as an aid to development.

### VIRGINIA ORANGE FREE STATE GOLD MINING COMPANY, LIMITED

#### SHAFT SINKING

No. 1 SHAFT was sunk 237 feet in quartzites of the Upper Witwatersrand System to a final depth of 4,229 feet. In addition, 101,975 cubic feet were excavated in the cutting of the fourth station and brow box, the entrance to the belt transfer level, the main shaft loading boxes, and the sump at the shaft bottom. The shaft was concrete lined to a depth of 4,226 feet, of which 269 feet were accomplished during the quarter. The intersection in pilot holes of water-bearing fissures, requiring cementation, delayed sinking operations.

## SHAFT EQUIPMENT

**No. 1 SHAFT**—Foundations for the second 4,400 H.P. Permanent Electric Winder were completed. The temporary headgear was dismantled and the erection of the permanent steel headgear was almost completed. Work on the erection of the conveyor gantry from the headgear was resumed. By the end of the quarter, preparations for equipping the shaft with concrete buntons and steel channel guides were nearly complete.

## DEVELOPMENT

Development during the quarter was confined to No. 2 Shaft, development at No. 1 Shaft having been stopped temporarily during the sinking of the shaft to its final depth and the installation of equipment.

A total of 3,300 feet of development was accomplished during the quarter and, in addition, 17,308 cubic feet were excavated in pump chambers, sumps and in service bays.

The intersection in pilot holes of water-bearing fissures, requiring cementation, considerably retarded development operations.

The following are the results of the quarter's development:—

	No. 2 Shaft
Footage advanced .. .. .	3,300
Footage on reef .. .. .	1,216
Footage sampled .. .. .	1,180
Payable footage sampled:	
Payable footage .. .. .	420
Percentage payable .. .. .	35.6%
Channel width—inches .. .. .	32.4
Channel value—dwt. per ton .. .. .	7.25
In.—dwt. .. .. .	235

(The above results are based on actual sampling. No allowance has been made for adjustments necessary in the valuation of the corresponding Ore Reserve.)

**REDUCTION PLANT**—Construction work has been resumed and is progressing satisfactorily.

**MINE BUILDINGS AND PLANT**—The extensions to the Electricity Supply Commission sub-station at No. 1 Shaft were completed. Work is now proceeding on the overhead power lines for the purpose of completing the ring main. Excavations for the workshop extensions have been commenced.

**EUROPEAN HOUSING**—Work on the extension of the permanent housing scheme was commenced and 73 houses are in the course of erection.

**NATIVE ACCOMMODATION**—Work has commenced on the erection of additional rooms at No. 1 Compound.

**LABOUR**—The labour strength at the end of the quarter was:—Europeans: 267; Natives: 1,300.

**CAPITAL EXPENDITURE**—Capital Expenditure amounting to £493,971 was incurred during the quarter on shaft sinking, buildings and plant.

The total Capital Expenditure, including preliminary expenses, incurred to 31st March, 1953, amounted to £6,126,464.

## KONONGO GOLD MINES

MR. ROBERT ANNAN'S REVIEW  
OF YEAR'S OPERATIONS

The nineteenth annual general meeting of Konongo Gold Mines, Ltd., was held on April 28 in London.

**Mr. Robert Annan, M.I.M.M.**, chairman of the company, presided, and in the course of his speech said: The accounts reflect a fall in production by comparison with the previous year. Output for our own account was 29,960 tons of ore yielding 26,897 ozs of gold, a reduction of 6,790 tons and 5,449 ozs respectively. As a result the revenue from gold fell by £48,919, but this was offset by decreased expenditure and by increased sundry revenue to the extent of £20,151, leaving a working profit of £142,491, which is £28,768 less than in the previous year. In the first six months 40 per cent. of our gold output was sold on the free market, after which the entire production was so disposed, the average premium realised over the whole year being 18s 3d per ounce over the whole of our production.

While our total expenditure shows some reduction, the costs per ton treated again show an increase, due to the reduction in tonnage, to a further increase in the cost of supplies and to an increase in African wages granted on April 1, 1952, which averaged 23 per cent. over the second half-year. The distribution of each 20s of our revenue was about as follows: Salaries and wages absorb 5s 3d, supplies and services 5s 5d, London office 5d, taxation 6s 4d, depreciation, etc., 1s, leaving 1s 7d available for dividend.

In the plant a modification of the treatment process has given very satisfactory results, the ratio of extraction being now over 94.5 per cent., as compared with 90.0 per cent. in the previous year, representing a gain in yield of about 14s per ton.

In the mine the ore reserve at the end of the year stood at 171,060 tons, of which 118,135 tons averaging 17.7 dwts, is available for stoping and 52,925 tons averaging 10.7 dwts is contained in pillars. During the past year 5,000 tons averaging 14.2 dwts was reclaimed from pillars and sent to the mill.

The total reserve shows a reduction of 6,210 tons and an increase of 0.3 dwt in value over the past year. Mine development during the year amounted to 3,219 ft, compared with 6,227 ft last year. Of 1,030 ft on reefs, 61 per cent. proved payable.

On the Odumase Reef the 15th level drive is being extended to the north-east towards Boabedroo to test the remaining unexplored area between the Odumase and Boabedroo workings at this horizon.

On the Zongo reef winzes were sunk from the 8th level, where results had been indifferent, and the 9th level has been driven at a vertical depth of 120 ft below the 8th. This has proved ore over a length of 305 ft, of which the last 10 ft are in Lyndhurst ground. Sampling of this working averaged

11.0 dwts over 90 ins, but the full width is not yet exposed in several places.

Preparations for sinking to the 10th level are in hand. Drilling of the 15th level south-west will be resumed to explore the area under this ore-shoot. The crosscut to Zongo from the 20th level Odumase has intersected the vein but without payable values. Further tests by diamond drilling will be made from this crosscut.

At Boabedroo on the 10th Level the stope drive was advanced 485 ft, of which 470 proved payable, averaging 14.0 dwt over a width of 128 ins, making the total payable length at this level 523 ft, averaging 17.5 dwt per ton over 122 ins, indicating a block of about 31,000 tons assaying 24.1 dwt between this and the 9th Level. Two winzes have now been sunk to the 11th Level and 315 ft have been driven on this level but without yet exposing the full width. The first 170 ft driven in the hanging wall averaged 10.1 dwt over 72 ins, the next 60 ft in the footwall averaged 2.5 dwt over 61 ins. The last 85 ft were again in the hanging wall and averaged 21.2 dwt over 84 ins. A crosscut has been made in this section showing the reef-channel to be 352 ins wide, of which the hanging wall section assayed 26.4 dwt over 91 ins and the footwall section 4.4 dwt over 261 ins. This work indicates a repetition of the conditions which existed on the 10th Level, but a final valuation of this section cannot be made until full exposures of the fissure have been made in further crosscuts. The 12th Level has now been advanced 430 ft from the main winze and at the end of March was 70 to 120 ft short of the downward projection of the ore-shoot on the 11th Level.

While there are no discoveries of major importance to report, development in the past year has maintained the ore-reserve at a satisfactory level, nothing being included as yet in respect of recent development on the 11th Level Boabedroo. We can therefore look forward to maintaining production at the present level while continuing to explore the rest of the possibilities of the concession. In the meantime the company has ample resources to follow up any success.

The report and accounts were adopted.

## AGENCE MINIERE ET MARITIME S A

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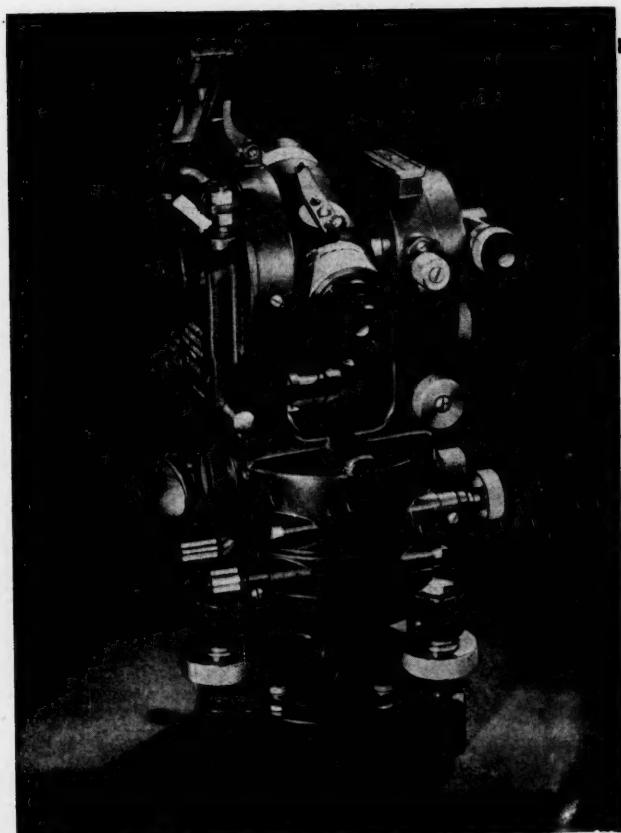
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